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THEORIZING WHEN USER REACTION TO IT IMPLEMENTATION IS NEITHER RESISTANCE NOR ACCEPTANCE, BUT CONSTRUCTIVE BEHAVIOR: A CASE STUDY OF HEALTHCARE IT IMPLEMENTATION

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A CASE STUDY OF HEALTHCARE IT IMPLEMENTATION

A dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy at Virginia Commonwealth University.

by

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Acknowledgment

This dissertation is dedicated to my family; my father and my mother, and my sister and my nephew. My sincere gratitude goes to my parents for supporting me emotionally and financially. I am eternally thankful for their innumerable sacrifices, endless love and unconditional support. This accomplishment is just as much theirs as it is mine.

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List of Acronyms

AA/R: Actors' Action/Reaction
ACOG: American Congress of Obstetricians and Gynecologists
AEHR: Ambulatory Electronic Health Records
ALE: Actors' Lived Experience
ALIE: Actors' Lived Implementation Experience
ALPE: Actors' Lived Post-Implementation Experience
AR: Actors' Reaction
CBM: Collective-Level Body of Meaning
CC: Conditions of The Context
CC_{t+1}: New Conditions of The Context
CIO: Chief Information Officer
CMIO: Chief Medical Information Officer
CNIO: Chief Nursing Information Officer
d/c D: design/configuration Discourse
div(CBM): divergence of the Collective-level Body of Meaning
EHR: Electronic Health Records
ei: episode of implementation
$ei(d/c)_t$: episode of implementation (design/configuration) at time t
EMR: Electronic Medical Records
ep: episode of post-implementation
i(d/c): implementation (design/configuration)
i(r): implementation (rollback)
i(t): implementation (transition)
OB-AEHR: Obstetrics Ambulatory Electronic Health Records
OBAP2: Obstetrics AEHR Phase 2
OB/GYN: Obstetrics and Gynecology
OCT: Office of Clinical Transformation
p: post-implementation
POITI: Process and/or Outcome(s) of IT Implementation
PT/V: Perceived Threat/Value
R/A: Resistance/Acceptance
SS: Social Structure
T: Technology
t: time of the episode
ULE: Users' Lived Experience
UR: Users' Reaction

Abstract

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The prevailing discourse of "resistance vs. acceptance" in IT implementation research mostly personalizes the issue as "users" versus IT implementers (e.g., managers, CIOs, CMIOs, etc.). This kind of discourse has created an IT-implementer-centric attitude among IS scholars and practitioners. The IT-implementer-centric attitude, while embraces "acceptance" as a desirable reaction almost unconditionally, frequently holds for minimizing or more conservatively suppressing "resistance" to IT implementation. In other words, the mainstream IT implementation research, almost completely, treats "users" as passive recipients whose choices, as they face pre-developed/pre-designed/pre-rolled-out technology being implemented, can only be defined on a spectrum from "acceptance" to "resistance." The current research study,

however, offers an alternative perspective that views the "resistance vs. acceptance" duality "from the other side," i.e., from the perspective of the supposed "resistors" or "acceptors" themselves. Through a review of the literature, this study first identifies major drawbacks of the extant theories and models of IT implementation research. Next, drawing on an interpretive paradigm of research (more specifically, phenomenological sociology), this study investigates a real world case of healthcare IT implementation. The results of the aforementioned literature review and case investigation subsequently form the basis for the study's proposed theoretical account, which provides an unprecedented understanding and explanation of how actors representing different stakeholder groups, among which people who are routinely called "users" are but one group, experience IT implementation as they live their everyday lives. The proposed theoretical account is lastly used as a guide for crafting both practical and research prescriptions with respect to managing IT-involved change occasions.

1   INTRODUCTION

1.1. Prologue

> A1 [a pseudonym] … called me and is very concerned about the title of the project [i.e., Theorizing How Resistance Can Be Constructive: A Case Study of Health Care IT Implementation] and what it might imply. (This is political and not necessarily personal or even rational) Specifically, he is concerned that someone is accusing his providers of "resisting" the IT. He feels very strongly that they did not "resist the IT implementation". What happened was it did not meet their needs and they worked hard as users to give feedback to the IS department to help them improve the product. I explained the best I could what the goals of your project are, and he agreed they are very important. It seems the wording that he is most concerned with. He thinks it may offend people. Can you call it something different and tone down the "resist" part? Perhaps: "User needs assessment and how it leads to improvement…"

The above text, which is quoted from an email conversation between one of my dissertation committee members and me, significantly portrays the need and implies the necessity for conducting the current research. It shows the kind of mindset that an influential actor who has been highly involved in the case of healthcare IT implementation that I am investigating in this research, holds. The case is about an obstetrics (labor and delivery) charting (or documentation) system implementation occasion where the intended "users" (i.e., mostly a group of physicians) did not like the system, and that led to putting the system on hold for a year while a group of clinical IT specialists did a major overhaul.

In the aforementioned quote, in fact, the person was upset about the implications that the previous version of this study's title could have. The previous version of the title was: "Theorizing How Resistance Can Be Constructive: A Case Study of Health Care IT Implementation." It is evident that even though the title, apparently, tries to associate resistance to a positive mood, the person still does not care about this kind of association. The only thing he cares about is the term "resistance" and all the bad connotations it could bring to one's mind.

The above-outlined real world example actually unfolds several lines of discussion and many ramifications. One major ramification relates to the notion of how big the gap can be between practitioners' and scholars' understandings of how change (including IT-involved change) can and should happen in organizational settings and how the reactions to that kind of change should be interpreted and handled. From the perspective of a mainstream management or IS scholar, the aforementioned healthcare IT implementation case can be considered a perfect case of "resistance to IT implementation." In fact, if one were to consider the taxonomy proposed by Coetsee (1993, 1999), in which he classifies resistance to change behaviors into the four levels of "apathy," "passive resistance," "active resistance," and "aggressive resistance," the healthcare IT implementation case might even appear as a perfect example of "aggressive resistance." The present research finds this kind of gap to be of major significance and contends that it should be deeply scrutinized to produce more relevant IS research in this area.

Following the ramification discussed in the previous paragraph, one can also think of another notion: the traditional duality of "resistance vs. acceptance" might not be

adequate for conceptualizing people's reactions to IT implementation. This is particularly true when a researcher strives to account for people's own understandings of their behaviors, which might apparently hinder the IT implementation process and yet not be acknowledged as resistive by those people themselves. This notion becomes even more critical when we consider the fact that the situation noted above is not a special case. There are numerous IT implementation failures reported in the literature in which "users" are accused of displaying resistive behaviors. However, in most cases, the idea is overlooked of how someone can add to, strengthen, and or build on the mainstream body of "resistance to or acceptance of IT implementation" research by not labeling people's reactions to IT implementation, right away, as "resistance," or of how asking intended "users" of IT to describe or articulate their own behaviors/reactions can affect, in the big picture, IS researchers' perspective. Addressing these kinds of issues can lead to shaping a new intellectual landscape where the most important issue is no longer how and or why intended "users" resist or accept a system as, what Jian (2007) calls, a "static and stable [object which embodies] rather fixed meaning, technical practice, power structure, and social arrangement." Instead, the most important issue becomes the notion of how people's reactions and technology become engaged in emergent, mutually constitutive relationships.

The present research study takes an interpretive approach that is rigorously grounded in the school of thought known as "social phenomenology" or, equivalently, "phenomenological sociology," to address the issues raised in the previous paragraphs. It strives to unpack ideas that have been attached to the "resistance vs. acceptance" duality and particularly investigates the ramifications of the fact that some behaviors,

which are usually mislabeled "resistance" (with its widely perceived negative connotations), can actually be constructive, especially in the eyes of people who are displaying those behaviors. On this basis, this research aims at reframing the commonly accepted duality of "resistance vs. acceptance" and introduces a new perspective where people's reactions to IT implementation are viewed from the other side. Because interpretivism and positivism can be mutually supportive (see Lee, 1991), the resulting body of theory in the present research is framed so as to complement, and help strengthen, the current body of IS research on "resistance vs. acceptance," which widely holds a positivist, IT-implementer-centric view. The present research strives to offer a different perspective, which takes into account the life experience and rationale of intended IT "users" when they are living through IT implementation occasions.

The remainder of this chapter proceeds as follows. Section 1.2 presents the main concepts used in this research. Section 1.3 provides some explanations about this study's background, motivations and importance. Section 1.4 provides the main research questions. Finally, section 1.5 presents an outline of the remaining chapters.

1.2. Basic Concepts' Definitions

This section offers definitions of the basic concepts in this dissertation. These concepts will significantly inform the process for defining and designing the specific theoretical framework and research approach that this dissertation uses for theorizing reactions to implementation of IT. The theoretical framework and the research approach will be fully explained in chapter 3.

Interpretive Sociology: This is a term "usually confined to those sociological approaches which regard meaning and action as the prime objects of sociology" (Scott

and Marshall, 2009). "In interpretive sociology, the focus is on understanding and interpreting the meaning of social actions in specific contexts (in particular, to the social actors involved), as in symbolic interactionism, phenomenological sociology, and ethnomethodology" (Chandler and Munday, 2011). Max Weber was the major figure who introduced interpretive understanding (*Verstehen*) into sociology. As Scott and Marshall (2009) argue:

> for [Weber] (The Methodology of the Social Sciences, 1904–17), Verstehen ('understanding' of people's actions) is the method par excellence of sociology. Understanding and interpretation are closely related, and most sociologists would now recognize that some interpretation is involved in all acts of understanding, although some maintain a more naïve view that there are unproblematic meanings in social reality which can be directly understood.

Behavioral Theory vs. Social Theory: A common, and supposedly intuitive, perspective among behavioral researchers in management and IS is that in any given organizational or social setting one can typically distinguish three levels of facts/properties/behaviors related to human beings in that setting. The levels are generally defined as individual, group, and organizational/social. In such a perspective, it seems completely valid to adopt a bottom-up approach in order to study facts/properties/behaviors related to human beings. On this basis, those researchers, who adopt such an approach, consciously or subconsciously believe in the notion that the building blocks of any collective-level phenomena (either group-level or organizational-level) are individual-level phenomena. This means that, from the perspective outlined above, organizational/social-level behaviors/intentions/perceptions can be viewed/studied as accumulation/aggregation/average of group-level behaviors/intentions/perceptions,

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and group-level behaviors/intentions/perceptions, in turn, can be viewed/studied as accumulation/aggregation/average of individual-level behaviors/intentions/perceptions. Adopting such a perspective, then, introduces two important implications: one, collective-level phenomena by no means could independently (from the individual-level phenomena) exist because of the bottom-up aggregative process which is in place; and, second, and connected to the first, if individuals in a social/organizational setting were to be replaced by new individuals, then the collective-level (either group-level or organizational-level) phenomena would totally change, again because of the bottom-up aggregative process that is in place to form those collective-level phenomena. A theory generated on the basis of the above-described perspective or approach can be called a "behavioral theory."

A "social theory" offers a perspective which is mostly contrary to the one described above. From the perspective of a "social theory," collective-level phenomena are something much more complex than just the accumulation/aggregation (or average) of individual-level phenomena. From the perspective of a "social theory," collective-level phenomena could exist, as objectively sensible as individual-level phenomena, independently from the individual level phenomena. Therefore, from the perspective of a "social theory," collective-level and individual-level phenomena could exist independently from each other while there can be dynamic and complex mutually constitutive relationships between the two. So, from the perspective of a "social theory," one cannot simply study the relationship between the individual and the collective as a one-way, bottom-up process. In other words, from the perspective of a "social theory," organizations/societies are not simply a collection of individuals. A major implication of

adopting a "social theory" perspective is that it seems totally valid and much closer to the reality of social settings to assume that individuals could fill in roles in a structure of roles in a social setting, live in that structure and then leave that structure while the collective-level phenomena (i.e., the structure itself and the shared understanding of that structure among people in that social setting, which could be called culture) would remain unchanged. This perspective is completely the opposite of the notion presented as the second implication at the end of the preceding paragraph.

The difference between a "behavioral theory" and a "social theory" can be also outlined in terms of a long historical debate between two camps of social scientists. In one camp, people who build and are interested in building "behavioral theory" mostly assume (consciously or subconsciously) "the primacy of facts about individuals over facts about social entities" (Little, 1999). According to Little (1999), these people, in fact, hold a position in conducting social science research that can be called "methodological individualism." Such a position or perspective is also recognized by C. Wright Mills (1959) as "psychologism." According to Mills (1959, p. 67):

> Psychologism refers to the attempt to explain social phenomena in terms of facts and theories about the make-up of individuals. Historically, as a doctrine, it rests upon an explicit metaphysical denial of the reality of social structure.

In the other camp, however, people who build and are interested in building "social theory" assume "the doctrine that social entities, facts, and laws are autonomous and irreducible" (Little, 1999). Little (1999) calls this kind of doctrine "methodological holism." Such a doctrine or position maintains that one of the most important social entities in any given social setting is social structure. Social structure is in fact a structure of positions/roles that could be filled by different individuals over time. The

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social structure itself is the product of a long social construction process in which such things as the authority/power scope of each role in the structure, the types of pairwise relationships between different roles, and the allowed or disallowed behaviors for each type of role have been collectively shaped over time. In this sense, a snapshot view of a social structure at a certain point would show that individuals are mostly and only role players in that structure, and that the structure in fact enables, constrains and otherwise shapes the behaviors and thinking of those individuals. One good example of a social structure is the kinship structure presented by Fred O. Gearing (1970, pp. 84-85) in his classic book *The Face of the Fox*.

Interpretive Social Theory: As is stated in the *Online Dictionary of Social Sciences* (accessed 16 February 2013), interpretive social theory is:

> a general category of social theory including symbolic interactionism, labeling, ethnomethodology, phenomenology and social constructionism. The term is typically contrasted with structural social theories which claim to remove the subjectivity of the actor and the researcher and assume that human behavior can best be understood as determined by the pushes and pulls of structural forces. Interpretive social theory, instead, is more accepting of free will and sees human behavior as the outcome of the subjective interpretation of the environment. Structural social theories focus on the situation in which people act while interpretive social theory focuses on the actors' definition of the situation in which they act.

Social Phenomenology (or Phenomenological Sociology): This approach to producing interpretive social theory was first conceptualized and introduced by Alfred Schutz (1899-1959). He came upon some problems in Max Weber's theory of action and hence took a phenomenological approach for the sake of providing a philosophical foundation for Weber's interpretive sociology (Orleans, 2000). "Schutz's migration to the United States prior to World War II, along with that of other phenomenologically inclined scholars, resulted in the transmission of this approach to American academic

circles and to its ultimate transformation into phenomenological sociology" (Orleans, 2000). One major expression of this approach has been called reality constructionism. "Reality constructionism synthesizes Schutz's distillation of phenomenology and the corpus of classical sociological thought to account for the possibility of [objective] social reality" (Orleans, 2000).

Sociological Imagination: This term was coined by the American sociologist C. Wright Mills in 1959 to describe the type of insight that should be offered by the discipline of sociology. As Mills (1959) explains, "the sociological imagination enables us to grasp history and biography and the relations between the two within society." For Mills, who consistently challenged the status quo with regard to the power structure in the world in general and the United States in particular, the sociological imagination is an essential intellectual quality, the understanding and acquisition of which can form the basis of a revolutionary social change. According to Mills (1959, p. 5):

> the sociological imagination enables its possessor to understand the larger historical scene in terms of its meaning for the inner life and the external career of a variety of individuals. It enables him to take into account how individuals, in the welter of their daily experience, often become falsely conscious of their social positions. Within that welter, the framework of modern society is sought, and within that framework the psychologies of a variety of men and women are formulated. By such means the personal uneasiness of individuals is focused upon explicit troubles and the indifference of publics is transformed into involvement with public issues. The first fruit of this imagination—and the first lesson of the social science that embodies it—is the idea that the individual can understand his own experience and gauge his own fate only by locating himself within his period, that he can know his own chances in life only by becoming aware of those of all individuals in his circumstances.

Socially Constructed Reality: This is a phrase that can be directly extracted from the seminal work by Peter L. Berger and Thomas Luckmann (1966). Berger and Luckmann (1966, p. 15) were believers in the notion that "theoretical formulations of

reality, whether they be scientific or philosophical or even mythological, do not exhaust what is 'real' for the members of a society." Since this is so, they suggest that a major sociological task is concerned with "what people 'know' as 'reality' in their everyday, non- or pre-theoretical lives. In other words, commonsense 'knowledge' rather than 'ideas' must be the central focus." On this basis, social realities are created, institutionalized, known, and made into traditions by humans. The social construction of reality is an ongoing, dynamic process that is (and must be) reproduced by people acting on their interpretations and knowledge of it. Because social constructs as facets of reality and objects of knowledge are not "given" by nature, they must be constantly maintained and re-affirmed in order to persist. This process also introduces the possibility of change in the fabric of meanings held by members of a society. For example, what "technology" is and what it means shifts from one generation to the next.

Social Structure: In this research, social structures are taken as extra-individual entities (or objects) that are physically invisible but sensibly are as real for human beings as any aspects of the physical and natural world. These entities emerge and evolve over time in societal contexts where individuals live and interact with each other. As a result of this emergence and evolution process, individuals become role players in a socially constructed structure that, in turn, enables, constrains and otherwise shapes the behaviors and thinking of all the different generations of individuals who fill and then leave their different positions (or roles) in that structure. One example of a social structure is a kinship structure that defines and determines the arrangements and relationships among people in a community such as a tribe (for example, see *The Face of the Fox* by Fred O. Gearing, 1970, pp. 84-85).

Natural Attitude vs. Scientific Attitude: The distinction between "natural attitude of daily life" and "scientific attitude" is an argument mainly pioneered by Alfred Schutz for addressing the problem of multiple social realities (Schutz I, 1962). This distinction "suggests a vast number of possibilities in the development of phenomenological models which might be useful in work beyond that immediately contemplated by Schutz" (Bensman and Lilienfeld, 1991, p. 15). Schutz (*Collected Papers* I, 1962, p. 208) argues for

> an analysis of the world of daily life which ... shall mean the intersubjective world which existed long before our birth, experienced and interpreted by others, our predecessors, as an organized world.... All interpretation of this world is based upon a stock of previous experiences of it, our own experiences and those handed down to us by our parents and teachers, which in the form of 'knowledge at hand' function as a scheme of reference.

As Bensman and Lilienfeld (1991) point out, Schutz at times uses the expressions "common-sense thinking" as well as "the natural attitude" and "the attitude of everyday life" to express the same basic idea. According to Bensman and Lilienfeld (1991, pp. 13-14):

> the attitude of everyday life has two basic [dimensions]: (1) an attitude towards time, and (2) an attitude involving rationality of action.... The attitude of everyday life implies psychological time with unequal intervals based on the depth of feeling and the degree of excitement accompanying the experience of the passage of time (*durée*). Thus, in the attitude of everyday life the individual does not calculate time in objectively measured units, a process which implies distance between the observer and the person experiencing time. The psychological concept of time implies minimal self-awareness and minimal distance between oneself as observer and as observed. The common sense attitude to rationality of action suggests that the actor takes into account only those alternatives which are relevant to his action in his own immediate situation and over which he may have some control. Thus, he does not plot explicit, logically possible alternatives which while logical are irrelevant to him and to the possibility of his acting upon them.... As a result, his actions are situationally

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egocentric in the same sense that psychological time is temporally egocentric.

On the other hand, "implicit in the concept of the natural attitude is the counter concept of the scientific attitude, which is the exact opposite of the natural attitude in its two major dimensions" (Bensman and Lilienfeld, 1991, p. 14). This means that

> in the scientific attitude, time is measured in the objective sense of the term with standardized units, independently of a feeling of involvement which increases or decreases the experience of passing time. In a sense, this means that objectivity is defined in part as the ability to detach oneself from experience as felt and all of the emotional overtones suggested by the phrase. More importantly, the scientific attitude rejects the notion of implicit rationality (what might be called 'situational closure'). All logical alternatives are considered independently of the pressures of subjective time; that is, the sequence of time used up in assessing these alternatives is flattened out and not considered as relevant. Within the framework of the logically possible alternatives, alternative means are postulated and alternative results are predicted. In this sense, alternatives are held to be open to rational analysis. Estimates of relative efficiency are then calculated, a decision is made, and the relative efficiency of the decision as against all alternatives is measured by subsequent research or evaluation. The cost of objective time is ignored, for under the natural attitude the time spent in making such assessments might, if thought out, be greater than any gain in efficiency caused by the assessment. In addition, the scientific attitude implies consciousness of each concept used, each method and procedure used, the statement of concepts, methods and procedures in objective and reproducible terms which allows the scientist as observer of his own actions and other observers to attribute the results to the procedures used as well as to the methods of observing and measuring. (Bensman and Lilienfeld, 1991, pp. 14-15)

Abductive Inquiry Process (Abductive Reasoning): As Waal (2005) explains, Charles Sanders Peirce (1839–1914) "[distinguishes] three basic kinds of reasoning: abduction, deduction, and induction. In abduction a series of apparently unrelated premises is replaced by a single proposition, called the hypothesis, which brings them all together and explains them. Building on this threefold distinction, he sketched the dynamics of scientific inquiry as follows: we begin with an abduction, that is, the

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formation, selection, and adoption of a hypothesis. Next, by means of deduction, predictions are derived from this hypothesis. Finally, these predictions are tested through induction, leading to a confirmation, rejection, or modification of the hypothesis."

Hermeneutic Circle: The hermeneutic circle is an intellectual device for making sure that an interpretive understanding of a meaningful entity (e.g., text, action, etc.) is consistent and smooth in every aspect. In this research, I will be utilizing the "hermeneutic circle" to make sure that my interpretive understanding of political, cultural, historical and socio-technical arrangements in the empirical setting of my research is consistent and has no interpretive breakdown. As Sarker and Lee (2006, p. 137) explain, "the hermeneutic circle [involves] four (though not strictly sequential) steps: first, the identification of interpretive breakdowns, resulting from a contradiction between what we already understand (sometimes this is called the 'preunderstanding') and what we actually observe; second, the examination of new data relevant to the breakdown being investigated and/or the reexamination (in a new light) of data examined in a previous iteration; third, the surfacing of questionable assumptions we had made earlier that contributed to the breakdown in our understanding; and fourth, our revision of the existing interpretation to resolve the breakdown."

Resistance to Change and Resistance to IT Implementation: The notion of resistance to change is credited to Kurt Lewin (Dent and Goldberg, 1999a). Lewin himself, in turn, "borrowed terms such as resistance from the physical sciences, which has resulted in a Newtonian, Cartesian mental model of change with a framework of planning, prediction, anticipation, and control" (Dent and Goldberg, 1999b). On the

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other hand, Lewin's conceptualization of the phrase is very different from the current uses of it. For Lewin, resistance to change could occur, but that resistance could be anywhere in a system of roles, attitudes, behaviors, norms, and other factors, any and all of which could cause the system to be in disequilibrium. Therefore, for Lewin, resistance to change was a systems phenomenon, not a psychological one (although the psychology of the humans in the system certainly is an element of the total system) (Dent and Goldberg, 1999a). Lewin's view about organizational and social change has been described as follows:

> systems of social roles, with their associated patterns of attitudes, expectations, and behavior norms, share with biological systems the characteristic of homeostasis—i.e., tendencies to resist change, to restore the previous state after a disturbance. In observing instances of successful change, Lewin noted that they had three phases: first, an "unfreezing," or disruption of the initial steady state, then a period of disturbance with trial of various adaptive possibilities, and finally a period of consolidation of change with a "refreezing" in a new steady state. (Marrow, 1972, pp. 231-232)

In the IS literature, however, compatible with what Lapointe and Rivard (2005, p. 464) assume, the primary dimension of resistance is considered the behavioral/psychological. In this sense, the taxonomy of resistive behaviors proposed by Coetsee (1993, 1999) is one of the most important frameworks used by the IS literature. This taxonomy includes four levels of resistance: apathy, passive resistance, active resistance, and aggressive resistance. As Lapointe and Rivard (2005, pp. 464, 467) describe:

> Apathy includes behaviors such as inaction, distance, and lack of interest. Manifestations of passive resistance are rather mild; they include delay tactics, excuses, persistence of former behavior, and withdrawal. Active manifestations are typified by strong but not destructive behaviors, such as voicing opposite points of view, asking others to intervene or forming coalitions. Finally, aggressive resistance behaviors such as infighting,

making threats, strikes, boycotts, or sabotage seek to be disruptive and may even be destructive.

IT Implementation: In this dissertation, the use of the term "IT Implementation" is aligned to the convention followed by some seminal studies such as those of Lapointe and Rivard (2005) and Markus (1983). In this sense, "IT Implementation" not only refers to technical aspects of introducing, installing, and using new IT in an organizational setting, but also involves social, cultural, and political changes brought about by the new IT.

1.3. Research Background, Motivation, and Importance

The present research study is motivated by several important implications that result from viewing people's reactions to IT implementation *from the other side*. One major implication, for instance, pertains to the notion of viewing *development* and *implementation* as one single integrated, iterative process where the idea of "involvement (or participation)" is not only limited to the *development* (or pre-roll-out) era. In fact, historically speaking, the boundaries between "design" and "use" in social/organizational technology utilization in general and in social/organizational IT utilization in particular, have significantly contributed to the mentality that is commonly called "designer-user opposition." Such a mentality has historically shaped the mainstream perspective of IT-involved change, although it has been challenged at several points of time and by several scholars in the past 20 years or so (for example, see Suchman, 1994). Drawing on a feminist perspective, Suchman (1994, p. 22) perfectly puts her criticism of the "designer-user opposition" mentality thus:

> the prevailing order of technology production is ... in favor of the myth of the lone (male) creator of new technology on the one hand, and the passive recipients of new technology on the other.

Under the prevailing order of technology production described by Suchman (1994), notions such as "user involvement," "user participation" and "user-centered design" started to grow mostly in the sphere of IS development (ISD) research in the past 40 years or so (Swanson, 1974; Barki and Hartwick, 1989; Saleem, 1996; Lynch and Gregor, 2004; Pries-Heje, 2008). The "designer-user opposition" mentality has been generally in place over all the past decades, however. The proof for this notion is that such studies as those of Beath and Orlikowski (1994), Markus and Mao (2004), and Wagner and Newell (2007) have shown that, in practice, and contrary to the heavy (espoused) theoretical emphasis on the idea of "user involvement/participation," people called "users" have mostly been ignored, given passive role, or their requirements only very marginally taken into account during design/development processes.

While the above paragraph portrays an unpleasant situation in ISD research, the IT implementation research, on the other hand, is not even close to ISD research (at least in terms of espoused theory) with respect to paying attention to the notion of involvement/participation. The prevailing "designer-user opposition" perspective outlined above comes into full shape when the mainstream body of IT implementation research theorizes people's reactions to IT implementation. The IT implementation research, in fact, is institutionalized mostly in the form of "resistance vs. acceptance" discourse. In other words, the mainstream IT implementation research, almost completely, treats "users" as passive recipients whose choices, as they face pre-developed/pre-designed/pre-rolled-out technology being implemented, can only be defined on a spectrum from "acceptance" to "resistance." In this sense, the IT implementation research mostly ignores the reality going on in many real world cases

where design/development phases usually do not lead to even adequate IT artifacts (especially in cases of implementing enterprise-wide tools such as ERPs, CRMs, and EMRs, owing to many factors, particularly the ones pertinent to participation and communication issues), and therefore there remains a crucial need for major revisions and modifications, and hence people's involvement/participation, after new IT gets rolled out.

Another major implication that can be raised from viewing people's reactions to IT implementation *from the other side* pertains to the concept of "resistance." Kurt Lewin's conception of the term "resistance to change" has made a big impression on the general management as well as the IS literature. As in many other areas, business scholars have tried to model their research on "resistance to change" based on the natural science model thinking style. From Lewin's perspective, one of the fundamental assumptions is that organizational systems are similar to biological systems, for he points out that "systems of social roles, with their associated patterns of attitudes, expectations, and behavior norms, share with biological systems the characteristic of homeostasis—i.e., tendencies to resist change, to restore the previous state after a disturbance."

However, on the other hand, Lewin's original conception of "resistance to change" has evolved over time; and as Dent and Goldberg (1999a, p. 25) point out, "because the terminology, but not the context, was carried forward, later uses [of Kurt Lewin's conception] increasingly cast the problem as a psychological concept, personalizing the issue as employees versus managers." As a result of this historical evolution, the IS literature has been developing an IT-implementer-centric view of resistance over the past decades. This view mostly draws on what philosophy of the social sciences calls

"methodological individualism" (Lee, 2010; Little, 1999), and it seems to be "both theoretically and practically limited, overly simplistic, and perhaps even misguided" (Ford et al., 2008).

Specifically, there are two major problems with the extant literature on resistance to IT-enabled change that motivate this research. One is a dominant IT-implementer-centric view that is the basis for most of the extant models of resistance to IT. Such a view mostly conceptualizes users' reactions to IT implementation as "resistance" and neglects this fact that "resistance" refers to just one possible way of conceptualizing people's reactions when they encounter new IT being implemented. In other words, "reaction" to IT implementation is what symbolic logic calls an "individual variable" for which "resistance" is what symbolic logic calls an "individual constant" for that individual variable.

On the other side, the way that the extant literature deals with the whole phenomenon of resistance to IT, brings about, at most, a reactive approach that only is able to manage (i.e., to take control of) users' behaviors.

On this basis, the extant literature largely overlooks the idea that people's reactions to IT implementation can be a potential contributor to increasing the likelihood of successful IT implementation, helping to build awareness and momentum for IT-enabled change, and eliminating unnecessary, impractical or counterproductive elements in the design or conduct of IT implementation (Ford et al., 2008).

The two major issues discussed above become more crucial when we look at some specific IT utilization contexts such as health care. In healthcare settings, we are facing the ever-increasing role of IT and how advanced IT is becoming an essential part of

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providing health-related services. Moreover, the highly professional nature of healthcare services makes healthcare IT something completely different from banking IT, manufacturing IT, or education IT. This is because in healthcare settings everything is tightly linked to the notion that the stakes are life and death. Moreover, the stakeholder dynamics of healthcare settings is highly complex. In fact, while on the one hand, we have healthcare professionals (e.g., nurses, physicians, etc.) holding strong uncompromisable humanitarian and professional values regarding their patients and their job, on the other hand, we have healthcare administrators who are mostly concerned about things such as financial performance, competitiveness, HIPAA and meaningful use of IT. Moreover, on yet another side, we have patients who are highly sensitive about their health condition and the privacy of their personal information. We also have healthcare IT professionals who increasingly value adopting state-of-the-art technologies. And this is just part of the picture. This complex landscape of diverse healthcare IT stakeholders and potential value conflicts among them is clearly pictured by some salient studies such as Fichman et al. (2011), Kohli and Kettinger (2004) and Kohli et al. (2012). Furthermore, Fichman et al. (2011) point out that most health care is provided in interdisciplinary teams and that healthcare settings are largely under the influence of complicated local and governmental regulations.

All the above characteristics make healthcare settings an appropriate context for conducting an interpretive case study with the aim of generating an unprecedented understanding that will be able to capture the rationale of users (mostly healthcare providers) when they experience and make meaning of IT implementation. Healthcare providers' rationale and experience is of high importance in healthcare settings. This is

so especially from the perspective that they are very sensitive to their patients' health conditions and they usually possess high levels of authority and autonomy, a fact that can make mandatory new-IT use almost impossible. In this kind of setting, it is therefore often possible to see a great deal of constructive and solid feedback from users, since they typically are more sensitive to bad IT than other groups of IT users in other kinds of organizations, and they are usually more powerful than those other groups of users in expressing their feelings, including disappointment and dissatisfaction. However, over the past decades, general IS as well as healthcare IS have suffered from a lack of understanding users' rationale and experience, and this has led to serious IT failures with non-compensatable consequences, as reported in Ash et al. (2004) and Han et al. (2005).

1.4. Research Questions

As was mentioned in the previous section, this research tries to address two major problems. For doing so, the major research questions that should be answered are:

1. *What new theory can be offered in order to interpret (account for IT implementation participants' own understandings) and explain (account for researchers' own case-independent understandings) people's reactions to their encounter with, or the implementation of, new information technologies, not necessarily pre-judged in terms of either "resistance" or "acceptance"?*

2. *What novel practical and research prescriptions follow from the perspective of the new theory?*

1.5. Dissertation's Structure

The reminder of this dissertation is organized as follows. Chapter Two provides a review of the extant IT implementation literature. Chapter Three describes different aspects of the theoretical framework that is the basis for theory building in this present research. This chapter also goes over the specifications of the current study's underlying inquiry process in terms of ontology, epistemology, methodology and methods. Chapter Four is dedicated to describing the real world healthcare IT implementation case that is investigated in the present study. Chapter Five draws on the theoretical and empirical investigations presented in its preceding chapters in order to propose a theoretical account for understanding and explaining reactions to IT implementation. Finally, chapter six expands on the theoretical account presented in Chapter Five to make practical and research prescriptions on how the proposed theoretical account can be used to think about people's reactions to IT implementation in a constructive manner.

2   LITERATURE REVIEW

2.1. Introduction

In IT implementation research, the endeavor to theorize individual or collective reaction(s) to IT implementation has resulted in employing various concepts such as resistance, apathy, acceptance, adoption, use, adaptation and support (see for example: Markus 1983; Davis 1989; Lapointe and Rivard 2005; Beaudry and Pinsonneault 2005; Offenbeek et al. 2012). The extant literature, in fact, contains several solid and illuminating theoretical accounts that significantly contribute to understanding and explaining how individual and collective reaction(s) to IT implementation emerge or occur. The task of evaluating the IT implementation research, however, cannot be completed by only investigating the concepts that IT implementation research studies employ or even by scrutinizing the theories that they propose, but rather by speculating more fully on the various theoretical visions that drive those studies. These various theoretical visions in most cases have strong roots in such disciplines as psychology, sociology, anthropology, political science and software engineering.

The issue of theoretical vision can be deemed mostly ontological in the sense that it corresponds to the way IT implementation researchers conceive, and hence presume, the nature or reality of the IT-involved change phenomenon in general. Particularly speaking, this present research study contends that such general ontological

presumption mostly manifests itself in IT implementation research studies through two major postulates: first, a major postulate, implicit or explicit, with respect to the nature or reality of change(s) introduced by the process and/or outcome(s) of IT implementation (POITI), and, second, a major postulate, implicit or explicit, with respect to the nature or reality of the antecedent(s) of reaction(s) to change(s) introduced by POITI.

Although the focus in the present literature review chapter is more on the "resistance to IT implementation" research, several seminal pieces from other areas of research such as "adoption," "adaptation," and "acceptance" are also taken into consideration. The remainder of this chapter will proceed as follows. Section 2.2 focuses on the seminal models or theories that explain, in one way or another, the reasons/mechanisms/antecedents of reaction(s) to IT implementation. Section 2.3 reviews some other studies that even though they are not focused on theorizing about reaction(s) to IT implementation, still provide some important theoretical extensions and implications. Section 2.4 goes over the extant literature on reaction(s) to healthcare IT implementation and examines its conceptual and theoretical ties to the general IT implementation literature. Finally, section 2.5 presents a synthesis of the current state of the literature mostly in terms of the above-described two postulates. The synthesis, hence, leads to establishing the need for an alternative theorizing vision, characteristics of which are explained in the following chapter.

2.2. Theorizing Reaction(s) to IT Implementation: Past and Present

This section is devoted to investigating the seminal models or theories of reaction(s) to IT implementation. In terms of resistance to IT implementation, while

there are numerous studies that refer to resistance to IT as a critical issue salient in different stages of IT implementation and usage in organizations, only a few studies focus on how and why resistance occurs. Rivard and Lapointe (2012) identify eight studies that bear such a trait (i.e., Markus, 1983; Hirschheim and Newman, 1988; Joshi, 1991; Martinko et al., 1996; Marakas and Hornik, 1996; Lapointe and Rivard, 2005; Ferneley and Sobreperez, 2006; and Kim and Kankanhalli, 2009). This research also reviews the studies by Klaus and Blanton (2010) and Meissonier and Houze (2010) in addition to those eight studies.

Lapointe and Rivard (2005) give us one of the most remarkable reviews of "resistance to IT" literature. In their paper, Lapointe and Rivard (2005) point out that although resistance has been recognized as a critical issue in IT implementation efforts since the 1980's (or even before then), there are not enough studies that try to open the black box of resistance and explicitly define its concept. On this basis, Lapointe and Rivard (2005) refer to just four pieces that propose theoretical explanations of how and why resistance occurs (i.e. Joshi, 1991; Marakas and Hornik, 1996; Markus, 1983; and Martinko et al., 1996).

In Joshi (1991), the author proposes that individuals attempt to evaluate most changes in terms of their equity implications. The author, then, uses a model called equity-implementation (E-I) to provide a theory-based understanding of information systems users' resistance to change. The model, which claims to be based upon the well-known equity theory, describes the processes employed by users in assessing IT-enabled changes on three levels. At the first level, users assess the variation in their equity status brought about by the system. At the second level, they compare their perceived benefits

or losses that the implementation of a system brings about with those of the organization. And finally, at the third level, they compare those perceived benefits or losses with that of other users in their reference group. Joshi (1991, p. 229), then, theorizes that "users who evaluate the change to be unfavorable in terms of inequity or loss of equity are likely to be distressed by the change and resist it." In two other similar studies, which also draw heavily on psychological theories, Marakas and Hornik (1996) and Martinko et al. (1996) adapt models of individual-level behavior to explain resistance behavior as either "a recalcitrant, covert behavior that results from both fear and stress stemming from the intrusion of the technology into the previously stable world of the user" (Marakas and Hornik, 1996, p. 208) or the consequence of "how individuals make attributions for failed as well as successful experience with information technology" (Martinko et al., 1996, p. 313). On the other hand, as Lapointe and Rivard (2005) explain, while Marakas and Hornik (1996) suggest some techniques to overcome resistance, Martinko et al. (1996) limit their resistance control suggestions to just those situations where dysfunctional attributions can have debilitating effects.

Among the four major studies investigated by Lapointe and Rivard (2005), Markus (1983) has the most influence over the way that Lapointe and Rivard (2005) theorize the resistance phenomenon. In fact, although implicitly, Lapointe and Rivard (2005) draw heavily on the notion of "interaction theory" originally presented by Markus (1983). While Markus (1983) mainly adopts the political variant of interaction theory to argue for the critical importance of the interaction of specific system design features with the power-related aspects of the organizational context of system use, Lapointe and Rivard (2005) expand on Markus's notions by broadening the two sides of the aforementioned

interaction. On the contextual factors' side, Lapointe and Rivard (2005) also add some other aspects such as work habits, compensation system and group social values. And on the system's or technology's side, which forms the "object of resistance," Lapointe and Rivard (2005) add "system significance" and "system advocates." All these expansions, eventually, allow Lapointe and Rivard (2005) to claim that their model is able to present a multi-level perspective that explicates resistance as a process composed of six elements: initial conditions, object of resistance, interaction, perceived threats, resistance behavior and consequences of system use/non-use.

Moreover, Lapointe and Rivard (2005) add a temporal view in terms of how what they call "episodes of resistance" evolve over time and how each episode has a trigger effect on what they call "object of resistance" and "initial conditions" (i.e., contextual factors) of its successor episode.

In another major study, Ferneley and Sobreperez (2006) examine current models of resistance and try to identify clearly the concept of workaround as a related but different, separate and subsequent phenomenon. The authors use a definition of workaround offered by Kobayashi et al. (2005) as "informal temporary practices for handling exceptions to workflow" (Ferneley and Sobreperez, 2006, p. 346). Using this concept of workaround, the authors claim that their proposed model extends previous resistance models and "identifies workarounds as an additional dimension to studies of resistance and a further strand to the discussions on the limitations of IS in particular contexts" (Ferneley and Sobreperez, 2006, p. 346). Ferneley and Sobreperez (2006) suggest that resistance rationale, which they consider to be either negative or positive, is often manifested in user workaround, which can be classified into three types: harmless,

hindrance and essential. Ferneley and Sobreperez (2006) also argue that there are four main antecedent conditions that in any given condition may lead to resistance, which in turn may result in different kinds of workarounds. Those conditions are enumerated as enforced proceduralization, discipline, non-engagement with the system and organizational and personnel issues.

The study by Ferneley and Sobreperez (2006) is one of those few studies that follow the interpretive paradigm and hence is concerned about gaining a deep understanding of rationales behind reactions of people to new IT. On the other hand, the authors, even though with limitations, believe in the necessity for leveraging resistance in a constructive manner. They argue that "if a key objective for management is 'to reduce the negative divergences and exploit the positive divergences which individuals make' (Sewell & Wilkinson, 1992), then we require a deeper understanding of the rationale behind positive and negative divergences" (Ferneley and Sobreperez, 2006, p. 346).

In contrast to Ferneley and Sobreperez (2006), Kim and Kankanhalli (2009) is a study that belongs to the mainstream resistance and acceptance research body in which resistance is mainly conceptualized on the basis of the notion of an ongoing battle between IT implementers and users and the necessity for managing resistance. In this study, resistance is defined as "opposition of a user to change associated with a new IS implementation" (Kim and Kankanhalli, 2009, p. 568). The authors focus on users' evaluation of change associated with new IT prior to its implementation. They think that this evaluation forms an important part of users' resistance behavior. In particular, this study's argument is shaped according to the notion that the missing part in the

explanation of user decision making regarding new IT is the concept of status quo bias; hence, the authors believe that "user resistance can be due to the bias or preference to stay with the current situation" (Kim and Kankanhalli, 2009, p. 567). The conceptual model proposed in this study is called an "integrative framework" and shows an integration of three perspectives: technology acceptance, resistance (based mainly on the equity-implementation model [EIM] originally presented by Joshi [1991]) and the status quo bias theory.

Another seminal research study on resistance is Klaus and Blanton (2010). In this study, the authors focus on enterprise systems (ES) implementation and try to investigate user resistance through the lens of the psychological contract employees have with their organization. So, this is another seminal study that employs a psychological theory to form a basis for understanding users' reactions to new IT. Its dominant perspective is also shaped by the importance of minimizing user resistance. Using the psychological contract theory, the authors argue that any sort of IT-enabled change can cause employees to perceive a psychological contract breach. In particular, regarding ES implementations, the authors point out that "employees are often asked to perform different tasks than they are accustomed to, work in a different environment than accustomed, and perform more tasks than those performed in the past. These changes may result in the breach of their psychological contracts … [So,] users may often feel justified in responding negatively towards the company because of the psychological contract breach or violation caused by the ES implementation" (Klaus and Blanton, 2010, p. 626). From this perspective, the authors conducted an empirical study in three phases: focus group interview, case study and semi-structured interviews. The

perspectives obtained through these empirical studies then allowed the authors to propose a model of user resistance behaviors development, which is actually an expansion of the development of violation model adapted from Morrison and Robinson (1997). In their model, the authors classify twelve already identified determinants that can upset the psychological contract and affect the level of user resistance into four key categories: individual, system, organizational and process issues.

The last seminal study that needs to be reviewed is Meissonier and Houze (2010). This study tries to contribute to the extant research on resistance to IT through theorizing the way individual and group resistance emerges and evolves during prior stages of IT projects rather than in the post-implementation stages. On the other hand, the authors also claim that "while IS literature has separately developed theories on resistance and conflicts, [they] conceptualize a whole theoretic-system" (Meissonier and Houze, 2010, p. 540) called "IT Conflict-Resistance Theory" (IT-CRT). The main considerations regarding this body of theory are summarized by the authors as follows:

- Acts of resistance indicate the way conflicts are expressed. In this sense, resistance is a behavioral dimension, whereas conflicts are indicative of attitudinal beliefs toward IT to be implemented.

- Conflict types related to IT (i.e. task-oriented, and socio-political oriented) are not exclusive and can overlap.

- Users may resist IT implementation by expressing only one part of the related conflicts.

- One challenge for managers is adopting conflict management styles (i.e. integrative, distributive, and avoidance) enabling identity of non-expressed parts of the conflicts. (Meissonier and Houze, 2010, p. 545)

Meissonier and Houze (2010) is one of the few studies that explicitly propose that resistance to IT should be embraced or even enhanced. In fact, the authors argue that their case study projects an alternative perspective: "a passive-like attitude among managers during IT pre-implementation phase does not prevent the resolution of a socio-political oriented conflict between two groups of employees" (Meissonier and Houze, 2010, p. 540). Therefore, the authors believe that an avoidance management style can invite team members to cope with conflict situations and to express tacit causes of resistance. On this basis, the IT-CRT theory proposed by Meissonier and Houze (2010) claims to support the idea that enhancing resistance can be a good approach in order to anticipate and resolve latent conflicts that are directly or indirectly related to IT projects.

2.3. Theoretical Foundations and Extensions

The purpose of this section is to highlight some major research studies that can be considered, in one way or another, as the theoretical basis or extension of the seminal models and theories discussed in the previous section. While some of the studies in this section support models and theories mentioned in the preceding section, others challenge the common logic and assumptions behind most of the seminal conceptualizations of the so-called "reaction(s) to IT implementation" phenomenon. Therefore, this section classifies the research studies into three major categories: classic studies that provide some major theoretical foundations, studies aligned with the

mainstream perspective, and studies that promote alternative approaches and perspectives.

2.3.1. Classic Studies

One of the major studies that pioneer an explicit use of Lewin's terminology in the IS field is Cooper and Zmud (1990). Cooper and Zmud (1990) apparently adopt Lewin's perspective in looking at IT implementation; hence, they explain the logic behind the steps of IT implementation as "initiation is associated with Lewin's unfreezing stage; adoption and adaptation are associated with Lewin's change stage; and acceptance, routinization, and infusion are associated with Lewin's refreezing stage" (Cooper and Zmud, 1990, p. 125). In this sense, Cooper and Zmud (1990) is one of those studies that initiate a tradition of looking at the human side of IT-enabled change situations mainly as psychological processes in which users' reactions to new IT are chiefly viewed as a dysfunctional barrier to successful IT implementation. This view is also dominant in another classic study, Ang and Pavri (1994). Although Ang and Pavri (1994) argue for a socio-technical approach towards designing and implementing IT, they consider "resistance to change [as] a normal psychological reaction." Subsequently, this is the line of thought that has been used by some seminal research studies to conceptualize and define resistance.

Another classic piece is Hirschheim and Newman (1988) which was mentioned as part of the eight seminal studies, but we review it here. In fact, Hirschheim and Newman (1988) can be considered a progressive exploration since it tries to show how typical viewpoints that picture resistance behaviors as unlawful or unwarranted acts might be invalid and how resistance can be legitimate. The authors also argue that

resistance is typically viewed in pejorative ways because change is perceived to be positive by change advocates. However, change need not always be beneficial, and this is when resistance is a force that should be encouraged. On the other hand, Hirschheim and Newman (1988) consider resistance to be a complex phenomenon with significant political and social aspects that needs to be approached using strategies that view IT-enabled change in terms of social and political processes.

2.3.2. Studies Aligned with the Mainstream Perspective

While the main focus in Munkvold (1999) is on proposing a stage model of the process of implementing IT for supporting collaboration in distributed organizations, the author also refers to the issue of resistance when he talks about a stage of IT implementation called "decentralized adoption" (Munkvold, 1999, p. 265). The author presents a concept named "local resistance" to explain the challenges of organizational units for adopting IT. As the author points out, one of the main challenges in the decentralized adoption stage is related to local resistance from organizational units. In explaining the reasons behind this "local resistance," Munkvold (1999), then, enumerates some issues: reduced autonomy, lack of involvement, lack of need felt, bonds to existing technologies and adoption costs. These issues are actually compatible with what the major research pieces on resistance to IT identify as some important reasons for resistance to IT (for example, see Kim and Kankanhalli [2009]). While Munkvold (1999) shows resistance as part of his conceptualization of IT adoption (i.e. the second stage in the IT implementation model proposed by Cooper and Zmud [1990]), Beaudry and Pinsonneault (2005), who focus on the issue of user adaptation (i.e. the third stage in the IT implementation model proposed by Cooper and Zmud

[1990]), present a model that shows how users' cognitive and behavioral adaptation responses related to technology, task and self can be used in a predictive manner to anticipate a wide range of user behaviors such as technology appropriation, avoidance and resistance. In their model, Beaudry and Pinsonneault (2005) illustrate that users choose different adaptation strategies according to a combination of their assessment of expected consequences of an IT event (i.e. primary appraisal) and their assessment of their control over the situation (i.e. secondary appraisal). On this basis, then, the authors identify four adaptation strategies: benefits maximizing, benefits satisficing, disturbance handling and self-preservation. These strategies, in turn, are hypothesized to result in three different individual-level outcomes: restoring emotional stability, minimizing the perceived threats of the technology and improving user effectiveness and efficiency.

One salient line of thought existent in the seminal studies that were reviewed in section 2.2 refers to the notion of "status quo." As we saw, Kim and Kankanhalli (2009) is a major study on this notion. In line with Kim and Kankanhalli (2009), there is another study by Polites and Karahanna (2012) that focuses on the notion of "status quo." On the other hand, in Polites and Karahanna (2012), there is a proposed model of new system acceptance of which a concept called "inertia" forms an important part. Polites and Karahanna (2012, p. 24) define individual-level inertial behavior in an IS context as "user attachment to, and persistence in, using an incumbent system (i.e., the status quo), even if there are better alternatives or incentives to change." In this sense, Polites and Karahanna (2012) suggest that there is a strong conceptual link between the two concepts, "resistance" and "inertia", and that, this link should be studied more

thoroughly by IS researchers. In fact, according to the literature-based perspective that Polites and Karahanna (2012) offer, if we do not accept "resistance" and "inertia" as two terms referring to the same concept, we, at least, should accept that "inertia" is a major antecedent to "resistance." This becomes clear when Polites and Karahanna (2012, p. 22) argue that "prior research has focused primarily on conscious resistance and its antecedents, such as switching costs and other 'mooring factors' ... however, resistance can have both conscious and subconscious sources. One subconscious source of resistance is incumbent system habit." The authors, then, present a conceptual model and the empirical statistical test of that model.

The introduction of the notion of "inertia" to the IS field, however, can be traced back to a classic 1981 study by Peter G. W. Keen. Keen (1981) introduces a concept called "social inertia" and defines it as "a complicated way of saying that no matter how hard you try, nothing seems to happen" (Keen, 1981, p. 24). The author then enumerates the main causes of social inertia, resistance and counterimplementation and stresses the pluralistic nature of organizations, an issue that necessitates incremental and facilitative change management tactics that rely on coalition-building and careful attention to political mechanisms. Moreover, relying on the two studies discussed above (i.e. Polites and Karahanna, 2012 and Keen, 1981), Mehrizi and Mòdol (2012) focus on the concept of "inertia" and try to show different types of socio-technical attachments that contribute to forming inertia. They use an exploratory case study of an unsuccessful technology replacement process to identify nine types of socio-technical attachments between the old technology and the organization. They, then, classify the nine socio-technical attachments into four categories: cognitive, structural, cultural and political.

On the other hand, the authors' analysis shows that socio-technical attachments are heterogeneous, as they are related to different social and technological aspects, they possess different dynamics, and they interact over the change process.

Another important line of thought among the seminal resistance to IT studies is the notion of "workaround." While Ferneley and Sobreperez's (2006) is one of the pioneer studies in this area, there are some other studies, such as Azad and King (2012), that significantly extend the notion of computer workarounds. One of the critical points in Azad and King's (2012) argument is the notion that computer workarounds can become institutionalized and be manifested in practice rather than appear just as temporary phenomena. The authors also explain the persistence of computer workarounds as a result of the tension between top-down pressures from the external environment and bottom-up constraints from day-to-day operational work.

Another way that the literature on resistance to IT has been extended pertains to studies focusing on classifying or ranking the reasons/types of user resistance. These studies also typically try to propose approaches/strategies for minimizing resistance and/or promoting acceptance. As one instance of such studies, Jiang et al. (2000) argue that different types of systems (i.e., TPSs vs. DSSs) tend to be associated with different organizational functions and classes of users, and hence may be resisted for different reasons. On this basis, Jiang et al. (2000) investigate the link between resistance reasons and system types and evaluate managerial perceptions of the relative importance of various strategies for promoting acceptance in the context of those types. Jiang et al. (2000) rank "change in job content" as the most important reason of user resistance, followed by "loss of status" and "altered relationships." On the other hand,

Jiang et al. (2000) show that the most effective promotion strategies are perceived to be those "involving employees" and having "open communication." In another study with the same nature, Klaus et al. (2010) come up with a rank ordering of reasons for user resistance, resistance behaviors and management strategy expectations of users in a mandatory adoption setting. Their results show that "additional workload" is the most significant reason for user resistance, followed by a "lack of fit," "technical problems" and "changed jobs." On the other hand, in terms of resistant behaviors, Klaus et al. (2010) point out that "challenging the management plan" is the most representative of users' experiences, followed by "impatience," "complaints" and then "trying to use the old system." Finally, regarding management strategies, Klaus et al. (2010) argue that a "clear concise plan" is the most desirable management strategy for users.

2.3.3. Alternative Perspectives

There are some studies that challenge the ideas and propositions presented in the studies that have been reviewed so far. For instance, Offenbeek et al. (2012) propose a two-factor view in an effort to integrate IT acceptance and IT resistance research. Their work can actually be considered a more organized extension of what Seo et al. (2011) present as "managing IS adoption in ambivalent groups." The main line of argument in these two papers is that while the common IS research attitude tends to categorize user behavior in terms of either acceptance or resistance; there are many real world situations in which users' behavior covers a range of ambivalence. So, although people may generally use technology they support, other kinds of responses are common as well. For example, there might be reactions such as "supporting but no or low usage" and "resisting but high usage" (Seo et al., 2011). Offenbeek et al. (2012) try to address

how IT implementers can deal with groups showing such ambivalent behaviors. According to the framework proposed by Offenbeek et al. (2012), there can be four categories of users' reaction to a newly implemented IT. Considering this framework, the authors argue that their study adds to the earlier contributions by conceptualizing acceptance and resistance as two distinct dimensions rather than as opposite ends of a bipolar continuum, and hence while an individual's acceptance and support levels tend to be similar, ambivalent behaviors such as "use and resistance" and "support and nonuse" do occur and may change over time.

The change in users' reactions to IT and IT implementation over time is also pictured well by Alvarez (2008). In her study, Alvarez (2008) shows how technology, structure and identity are in a mutually constitutive relationship. As one illustration of such a mutually constitutive relationship, Alvarez (2008) provides us with a real world case of an Enterprise System (ES) implementation in which users were strongly supportive of the ES in the earlier stage of implementation when the technology was an imaginary phenomenon, but became resistant against the same system in later stages when the ES produced loss of control and an inability to function as an arbiter of fairness in allocating resources associated with the system. Alvarez (2008, p. 203), hence, concludes that the ES directly challenged existing professional identities and roles; and this, in turn, led to users' reaching inside the technology and reshaping it by devising creative workarounds that could produce a sense of reskilling to counter the deskilling produced by the ES.

Another alternative perspective can be extracted from the work by Moreno (1999). In his work, which is mainly focused on organizational changes induced by BPR

processes, Moreno (1999) follows a phenomenological approach to show that reengineering projects lead to unveiling the conflicts inherent in the arrangements that generally characterize a workplace. In this sense, Moreno (1999) argues that his findings go beyond the traditional belief that the basic reason for resistance in BPR projects is the fear of layoffs or the modification of power arrangements. Instead, Moreno (1999) suggests that researchers and managers should view such factors as just part of the problem. Moreno (1999, p. 359) believes that "it is necessary to understand the important role of the crisis that reengineering may generate in individuals' ongoing process of sense making." Therefore, one might extend Moreno's (1999) argument to the IT implementation context and think about resistance behaviors as "variant ways in which organizational members react to oppositional meanings of ICTs that embody organizational tensions and contradictions" (Jian, 2007). In fact, as Jian (2007, p. 521) theorizes, IT-enabled transitions could trigger and/or intensify some inherent organizational tensions through which competing meanings of IT could be constructed and appropriated. On the other hand, by considering multiple and competing meanings of IT, Jian (2007) challenges the mainstream resistance to IT research that assumes information technologies are static and stable objects embodying a rather fixed meaning, technical practice, power structure and social arrangements that disregard contextual differences.

The last alternative perspective, which is worth reviewing here, challenges the common beliefs about the importance of such antecedents as "perceived threats" in shaping resistance behaviors. In fact, studies such as Prasad and Prasad (2000) and Selander and Henfridsson (2012) present a deeper perspective in terms of how factors

such as discourses (or value systems) of different groups of stakeholders affect the constitution and evolution of people's reactions to organizational changes (including IT-involved changes). In this line, Prasad and Prasad (2000) present an ethnographic account of informal (or routine) resistance and its ability to limit managerial control in a health-maintenance organization undergoing computerization of its administrative functions. In their paper, Prasad and Prasad (2000, pp. 387-388) distinguish between formal and informal (or routine) forms of resistance and explain that while "the former refers to any kind of organized collective opposition that typically takes the form of organized worker protests, strikes, grievances, output restrictions, etc.," the latter, on the other hand, "refers to less visible and more indirect forms of opposition that can take place within the everyday worlds of organizations" and "unlike much of formal resistance, is often unplanned and spontaneous, occasionally being even covert in nature." On this basis, Prasad and Prasad (2000) then argue that routine resistance is the consequence of a discursive constitution process which can encompass different mechanisms including (a) owning resistance, (b) naming resistance and (c) designating indirect resistance. Using these conceptions, Selander and Henfridsson (2012, p. 292) argue that while "one distinguishing feature of Lapointe and Rivard's (2005) model is its insistence on tracing resistance behavior to perceived threats, a closer review of the literature … suggests, however, that resistance may not necessarily involve perceived threats. As an example, an antecedent of resistance is what Prasad and Prasad (2000) referred to as naming resistance." To describe the meaning of the naming resistance mechanism, Selander and Henfridsson (2012, p. 292) offer the following explanation:

> Naming resistance is the process by which particular actions and/or incidents are labeled as resistance behaviour. Once incidents are framed as

resistance, such framing becomes a powerful way of exposing managerial incompetence or user ignorance [to other members of the organization]. Such exposure is typically materialised as narratives, gossiping or storytelling among organizational actors (Prasad and Prasad, 2000). Prasad and Prasad (2000) argued that multiple acts of routine, or passive, resistance by several actors may open up a set of spaces in an organisation. They suggest that such spaces of resistance (cf. Fleming, 2005) allow organisational actors 'to renegotiate their own positions and preserve some amount of personal dignity in a period of technological change, from which they had been largely excluded' (Prasad and Prasad, 2000, p. 402). However, this form of passive resistance may not radically change the path of the organisation. It may rather 'stretch it in ways that make it a more habitable space for those for whom escape or exit is not a viable option' (Prasad and Prasad, 2000, p. 402). In other words, multiple acts of routine resistance, deliberate/conscious or not, may have the function of constructing a more habitable space (breathing room) under conditions where certain actors are under pressure within an organisation.... In addition to resistance as a response to perceived threats then (Lapointe and Rivard, 2005), resistance can be nurtured in spaces of resistance, keeping resistance at arm's length from the actual IT implementation (Prasad and Prasad, 2000).

2.4. Theorizing Reaction(s) to Healthcare IT Implementation

This section tries to investigate some major research studies that are specifically titled healthcare IT studies or are presented through healthcare IT or medical informatics outlets. While some of these studies originated in the medical informatics field, some others mostly follow the tradition set by IS scholars for studying resistance (or reactions) to IT implementation. Seeing them as a separate research stream, this section also distinguishes those studies that highlight the role of different stakeholder groups and investigate such issues as power or value conflicts in the process of healthcare IT implementation. Therefore, in this section there are three different subsections to reflect each of the research streams discussed above.

2.4.1. Studies from Medical Informatics

The history of studies focusing on the issue of reactions to healthcare IT implementation can be traced back to some classic studies such as Dowling (1980), Brenner and Logan (1980), Kaplan (1982), Kaplan (1985), Anderson et al. (1986) and Kaplan (1987). For instance, Dowling (1980) conceptualizes the issue, generally, as staff interference with the implementation and use of medical computer-based information systems (MCBISs). Dowling (1980, p. 23) believes that such "interference can have significant consequences in terms of cost, lost earnings, organizational disruption and poor quality of care." He investigates three cases of staff interference with the implementation and use of an ECG interpretation system, a clinical laboratory information system, and an admission, discharge, and transfer system, followed by a survey of 40 randomly selected American hospitals with MCBIS experience. Dowling (1980) then categorizes the manifestations of interference into five types: passive resistance, oral defamation, alleged inability to operate the system, data sabotage, and refusal to use the MCBIS. Based on these findings, Dowling (1980) concludes that some factors such as pre-existing organizational problems, hardware and software problems, and lack of user involvement contribute to the failure of MCBIS implementation and use; and hence, some methods such as access restriction, user identification and preventive organizational diagnosis might be helpful in preventing, limiting and detecting staff interference. Compatible with what Dowling (1980) mentions about the role of organizational factors, Brenner and Logan (1980) also look to organizational factors. Brenner and Logan (1980) claim that "the root cause of [IT] non-diffusion would appear to be more related to the interaction between MISs and professional

conventions" such as personal autonomy and doctor-patient interaction, which Kaplan (1982) and Anderson et al. (1986) also identify as primary professional values and roles in the adoption and use of medical information systems. Brenner and Logan's (1980) emphasis on the interaction between MISs and professional conventions also forms the basis of their argument for understanding reactions attributed to physician resistance. On the other hand, taking a more sociological perspective, more recent studies, such as Timmons (2003), show that reasons for resistance are likely to be found at the interface between system design, on the one hand, and users' culture and practice, on the other hand. Timmons (2003) presents the concept of "resistive compliance," which seems similar to what Seo et al. (2011) and Offenbeek et al. (2012) present as "ambivalent behaviors," to conceptualize nurses' relationship with a computer system. In another study, Whittaker et al. (2011) also focus on the response of nurses to a medical information system. Whittaker et al. (2011) argue that in addition to some technological factors and individual differences, the added features of nursing culture and group differences are influential factors in fuelling the nurses' resistance to the system. Whittaker et al. (2011) also explain that how nurses' perceived lack of cultural fit between the system and their work leads to the fact that the nurses feel unprepared to adapt their processes to integrate the system into their work.

While there are numerous studies that focus on negative reactions of healthcare IT users, in contrast, as Kaplan (1985, 1987, and 1997) points out, there are many complex applications of computers in medicine that physicians have enthusiastically adopted. For example, Gardner and Lundsgaarde (1994) report on a study in which respondents (including physicians and staff nurses) did not feel that a clinical expert computer

system would lead to external monitoring or decrease in their decision-making power. In line with this perspective, there are some other recent studies, such as Gund et al. (2012), Zwaanswijk et al. (2011) and Haase and Loiselle (2012), that present the same idea. All of these studies show that healthcare professionals respond positively to the use of ICT tools in health care and believe that ICT can promote the efficiency and quality of care. However, the respondents in the above studies were still concerned about some issues such as the confidentiality and safety of medical information exchange and the reliability and quality of patient data.

2.4.2. Studies Following the IS Tradition

Rivard et al. (2011) adopt an organizational culture-based perspective and find four values that play a central role in medical information systems implementation. Two values, quality of care and efficiency of clinical practices, are considered to be important values from a cultural integration perspective; two others, professional status/autonomy and medical dominance, are considered to be paramount from a cultural differentiation perspective. Finally, Rivard et al.'s (2011) analysis from a cultural fragmentation perspective reveals that hospital users sometimes have ambiguous interpretations of some systems' characteristics and/or implementation practices in terms of their consistency with the above four values.

Aside from the Rivard et al.'s (2011) study, there are many other studies that are mainly driven by the traditions and the research culture existing in the IS field. For instance, Lauer et al. (2000) follow the same tradition established by Joshi (1991) that uses the equity-implementation (E-I) model to achieve an understanding of how individuals attempt to evaluate most changes in terms of their equity implications.

Lauer et al. (2000) use the same model for investigating a case of implementation of a patient scheduling and appointment system in a health-maintenance organization. Another instance is Bhattacherjee and Hikmet (2007). Bhattacherjee and Hikmet's study (2007) is one of the major studies that present a model of physicians' resistance to healthcare information technology (HIT) usage by integrating the literatures on technology acceptance and resistance to change. In their proposed model, Bhattacherjee and Hikmet (2007) explain the interdependent and asymmetric effects of inhibiting factors, like resistance, on HIT usage intentions relative to enabling factors, such as perceived usefulness and perceived ease of use.

Having the same technology acceptance based perspective, Nov and Schecter (2012) focus on the determinants of EMR individual use by physicians after institutional adoption has taken place. In their study, Nov and Schecter (2012) investigate four dimensions of EMR use (i.e., use intensity, use extent, use frequency and use scope) and find that the resistance to change (RTC) is related to perceived ease of use and also to perceived usefulness both directly and through the mediation of compatibility with preferred work style. Nov and Schecter (2012) use a specific conceptualization of resistance to change developed by Oreg (2003). On this basis, they define resistance as a personality trait that consists of four related, yet distinct dimensions: routine seeking, emotional reaction to change, short-term focus, and cognitive rigidity. However, Jensen and Aanestad (2007) try to go beyond the individual-level understanding of reactions to healthcare IT implementation by building a different discourse for framing the relationship between IT and organizational aspects of healthcare settings. Jensen and Aanestad (2007) propose the concepts of "hospitality" and "hostility" to focus on the

interaction between the host (the surgeons) and the guest (the information system) in a case of an electronic patient record (EPR) system adoption among surgeons. Jensen and Aanestad (2007) argue that the boundaries between the host and the guest evolve in the everyday work practices and that the usage of the "hospitality" and "hostility" concepts provides an alternative to previous studies on technology adoption to acknowledge the mutual and co-constitutive relationship between users and technology and the continued coexistence of both positive and negative attitudes among users.

Another important stream of research includes those studies that focus on the "workaround" notion originally presented in IS by some researchers such as Ferneley and Sobreperez (2006). For example, Azad and King (2008) believe that computer workarounds in health information systems (HIC) threaten potential efficiency gains. By looking at computer workarounds as a post-implementation phenomenon, Azad and King (2008) study enacted workaround practices that enable physicians to stretch certain rules, while inducing others to cooperate, in a hospital where the negotiative property of the hospital's organizational environment allows for flexible interpretations of existing computer-based procedures. Azad and King (2008) also find significant variety in roles, timing and interactions within the enacted workaround practices. From this variety, Azad and King (2008) make a specific conceptualization of four different patterns of workarounds revolving around one function of a health information system (HIS): habitual, verbal signature, fail-safe switch, and concurrent approval.

Yang et al. (2012) and Koppel et al. (2008) are other instances of these types of studies. In Yang et al. (2012), the authors try to advance the previous research on "workarounds in the use of healthcare IS" by doing theoretically grounded empirical

research. Yang et al. (2012) claim that most of the previous studies have been either conceptual or empirical and so there is a need for theoretically grounded empirical research in this area. On the other hand, Yang et al. (2012) believe that there is a lack of understanding about the effects of workarounds on the impact of healthcare IS. On this basis, Yang et al. (2012) consider workarounds as a result of a misfit between a new information system (IS) implementation and existing work processes and apply "accommodation to misfit" and "IS evolution" theoretical perspectives to develop a process framework to explain how the benefits, issues and workarounds inter-relate and determine the impacts of a healthcare IS.

Kane and Labianca (2011), however, take a slightly different approach towards conceptualizing the post-implementation phenomenon. As they argue, their main focus is on a particular type of post-adoption resistance, which they call "IS avoidance." Kane and Labianca (2011) believe that "IS avoidance" refers to those situations where individuals avoid working with adopted IS despite the need and opportunity to do so. One interesting finding in this paper, which uses both quantitative and qualitative data analysis methods, is that negative outcomes of IS avoidance can be invisible at the individual level. In other words, "avoidant workers could develop common [or shared] workarounds within their cluster to compensate for their shared avoidance preferences ... such shared workarounds meant that people within the cluster, could avoid using [multiple implemented systems] without significantly affecting others in the cluster, because the others did not expect them to enter data into [those systems] for later use" (Kane and Labianca, 2011, p. 516). One important implication of this finding, then, would be the insight shared by Kane and Labianca (2011, p. 518) that "user-system

relationships are not independent dyads; they should be examined in the context of their wider network of relationships."

2.4.3. Studies Focused on Stakeholder and Power Theories

The shared theme among all of the studies covered in this section is a concentration on power and stakeholder related issues in the context of healthcare IT implementation. One of the famous studies, which brings a significant power-based perspective into the healthcare IS domain, is Doolin (2004). Doolin (2004) introduces a Foucauldian conception of power for analyzing the implementation of a large information system in a New Zealand-based hospital. As Doolin (2004) observes, while the system was intended to monitor and scrutinize clinical activity, doctors in that specific clinical setting resisted the application of the information produced by the system by challenging its validity or using it to argue for more resources. The resistance by doctors led to a reinterpretation of the role of the information system, and its role was relegated to a less significant one. Doolin (2004, p. 358) concludes that a Foucauldian conception of power can highlight "the role that certain information systems play in mobilizing particular organizational realities through the discursive concepts, norms and values embedded within them."

In contrast to Doolin (2004), Blake et al. (2010) report the success story of a major healthcare IT implementation undertaken by a hospital. In their case report, Blake et al. (2010) focus on the role of multiple stakeholder groups involved in healthcare IT implementation in that hospital. They investigate how different stakeholder perspectives, rather than causing conflict, were leveraged through a collaboration-intensive process. Blake et al. (2010) then present some of the lessons learned. For

instance, they argue that the reasons behind IT-enabled changes should be uniformly communicated to all relevant stakeholders and that this can lead to increasing the acceptance of changes and contribute to positive attitudes toward healthcare IT use and benefits. Blake et al. (2010) also point out that for reducing resistance during IT implementation, healthcare organizations should strive to "personalize" IT implementations. This means that "health care organizations should make implementations less about technology and more about a patient care improvement-centered initiative of interest to all stakeholders" (Blake et al., 2010, p. 137). These notions are compatible with what Ash et al. (2000) suggest regarding the necessity of communicating change plans to all important stakeholders. On the basis of an analysis of a hypothetical case and discussions about the case by commentators, Ash et al. (2000, p. 134) further argue that healthcare IT stakeholders must be able to "come together, engage in constructive problem solving, create a common strategy, and actively take charge of [IT-enabled changes]."

In another study, Boonstra and Govers (2009) look at how implementing enterprise resource planning (ERP) systems in healthcare settings can affect and be affected by stakeholders with varying perspectives and interests. Arguing that a feature of the healthcare sector is that responsibility for services is shared among many autonomous units, Boonstra and Govers (2009) develop a theoretically based model to analyze how stakeholder attitudes and behaviors in a real world hospital setting affect the outcomes of ERP implementation. They also present an interesting model of changing levels of different stakeholders' involvement during the ERP implementation process in the hospital. The model illustrates how the management board, which was

initially involved, became dormant, and physicians, who were dormant at the start, after a crisis became active and tried to influence the implementation process.

Bartos et al. (2011) is the last study worth being reviewed in this part. Bartos et al. (2011) combine theories on power, influence tactics, and resistance to develop a model called Ranked Levels of Influence. The authors then apply the model to two documented examples of EHR/CPOE failures at Cedars-Sinai and Kaiser Permanente in Hawaii. Using the Ranked Levels of Influence model as a guideline, the authors argue that the system failures in these two cases were associated with the use of hard influence tactics, which are based on legitimacy, are coercive and/or possess expertise power bases, and that these tactics resulted in higher levels of resistance. Therefore, Bartos et al. (2011) suggest that for stabilizing or de-escalating resistance it is necessary to keep the influence tactics at soft levels where charisma, information and/or reward form the bases of enforced power.

2.5. Synthesis and Discussion

As the literature review in the previous sections shows, different parts of the IT implementation research literature have striven to theorize people's reactions to the implementation of different types of IT artifacts such as financial computerized systems (e.g., Markus, 1983; Beaudry and Pinsonneault 2005), CRMs (e.g., Selander and Henfridsson, 2012), Pharmacy Dispensing Systems (e.g., Azad and King, 2008), ERPs (e.g., Meissonier and Houze, 2010), EMRs/EHRs/EPRs (e.g., Lapointe and Rivard 2005; Jensen and Aanestad, 2007), CPOEs (e.g., Ash et al., 2000; Bhattacherjee and Hikmet, 2007; Bartos et al., 2011), and healthcare ERPs (e.g., Boonstra and Govers, 2009).

This section synthesizes and discusses the results of the literature review conducted in sections 2.2, 2.3, and 2.4.

2.5.1. Synthesis: A Map of Theoretical Visions in IT Implementation Research

The most prominent studies reviewed in sections 2.2, 2.3, and 2.4 along with some other seminal IT implementation research works are positioned inside a tabular map (see Figure 1). The map is constructed on the basis of two dimensions that are compatible with the two postulates described in section 2.1. As a reminder the postulates were:

1- A major postulate, implicit or explicit, with respect to the nature or reality of change(s) introduced by process and or outcome(s) of IT implementation (POITI)

2- A major postulate, implicit or explicit, with respect to the nature or reality of the antecedent(s) of reaction(s) to change(s) introduced by POITI

The map (i.e., Figure 1) can be used to interpret the presumptions that each research study shown in the map holds with respect to the two postulates described above. For instance, in terms of the first postulate, Hirschheim and Newman (1988) mostly assume a *socio-political* nature for the organizational change introduced by "development and implementation of computer-based information systems" (Hirschheim and Newman 1988, p. 406). On the other hand, in terms of the second postulate, Hirschheim and Newman (1988) use empirical evidence from a case study to show that a mixture of both *status-quo-type* antecedents (i.e., antecedents associated with arrangements in the pre-IT-implementation world) and *disruption-type* antecedents (i.e., antecedents associated with disruption of arrangements in the pre-IT-

implementation world through changes introduced during the IT implementation time) have an effect on "user resistance" (Hirschheim and Newman 1988, pp. 405-406). In another research study, Venkatesh et al. (2003), however, adopt a different theoretical vision. In terms of the first postulate described above, Venkatesh et al. (2003) presume that change(s) introduced by POITI, for the most part, have a *psycho-technical* nature. In other words, Venkatesh et al. (2003) approach IT-involved change as if it were solely a change in the relationship between individual "users" and IT in a workplace. On the other hand, in terms of the second postulate, Venkatesh et al. (2003) seem to assume that antecedents of "user acceptance" primarily have a *disruption-type* nature—i.e., their research is primarily focused on a "new system" and the disruption associated with it (Venkatesh et al. 2003, p. 447). Mehrizi and Mòdol (2012), as the last exemplary research study in this section, offer yet another different theoretical vision. In terms of the first postulate, Mehrizi and Mòdol (2012) explicitly presume change(s) introduced by POITI to chiefly have a *socio-technical* nature. More specifically, Mehrizi and Mòdol (2012) take a perspective in which POITI is mostly considered to bring about a change in how social properties of social/organizational settings interact with information technologies. In terms of the second postulate, on the other hand, Mehrizi and Mòdol (2012) clearly advocate a *status-quo-type* nature for the antecedent(s) of reaction(s) to change(s) introduced by POITI. In fact, Mehrizi and Mòdol (2012, p. 2) propose a concept called "socio-technical attachment" in order to emphasize the role that existing socio-technical arrangements can play in potentially hampering any future IT implementation process.

Nature of Change(s) Introduced by POITI / Nature of the Antecedent(s) of Reaction(s) to Change(s) Introduced by POITI	Psycho-Behavioral	Psycho-Technical	Socio-Political	Multilevel	Socio-Technical
Status-Quo-Type					Mehrizi and Modol (2012)
Disruption-Type	Marakas and Hornik (1996)	Davis (1989); Cooper and Zmud (1990); Moore and Benbasat (1991); Taylor and Todd (1995); Venkatesh et al. (2003); Beaudry and Pinsonneault (2005); Barki et al. (2007); Klaus et al. (2010)	Blake et al. (2010); Bartos et al. (2011); Meissonier and Houze (2010); Timmons (2003); Rivard et al. (2011); Jensen and Aanestad (2007); Doolin (2004); Ash et al. (2000); Boonstra and Govers (2009)	Lapointe and Rivard (2005); Selander and Henfridsson (2012); Lapointe and Rivard (2006); Kane and Labianca (2011)	Ferneley and Sobreperez (2006); Alvarez (2008); Azad and King (2012); Whittaker et al. (2011); Azad and King (2008)
Both Status-Quo-Type and Disruption-Type	Joshi (1991); Lauer et al. (2000)	Dowling (1980); Martinko et al. (1996); Compeau and Higgins (1995); Bhattacherjee and Hikmet (2007); Klaus and Blanton (2010); Nov and Schecter (2012); Kim and Kankanhalli (2009); Kane and Labianca (2011); Offenbeek et al. (2012); Polites and Karahanna (2012); Venkatesh et al. (2012)	Markus (1983); Keen (1981); Hirschheim and Newman (1988); Prasad and Prasad (2000); Ngwenyama and Nielsen (2013)		Jian (2007)

Figure 1: A Map of Theoretical Visions in IT Implementation Research
■ : The Research Gap

One important point about the map shown in Figure 1 is that the intention was to position each research study inside only one cell in the map with respect to the primary spirit and underlying perspective that that particular study promotes. However, this does not refute the fact that some research studies in Figure 1 might cover a zone which would go beyond the primary cell they are situated in.

Some explanations of the ideas behind the way in which the columns in the map are labeled are required. The column labeled *psycho-behavioral*, for instance, is included in the map in order to distinguish those studies that mostly address change(s) introduced by POITI as change(s) in the psychological state of individuals. Studies holding the psycho-behavioral postulate have strong theoretical roots in psychology and

social psychology. *Psycho-behavioral* studies generally take new IT as a given, unchangeable element so that issues related to the technological side of IT implementation including IT design/redesign are mostly irrelevant. In other words, *psycho-behavioral* studies do not question the suitability of new IT; instead, their primary focus is on how the psychological state of individuals can be managed in order to have a non-problematic IT implementation process. *Psycho-behavioral* studies might also be considered to hold a perspective which is close to what Markus (1983) calls "people-determined theory."

Another column in Figure 1 is labeled *psycho-technical*. Studies holding the *psycho-technical* postulate generally have strong theoretical roots in psychology, social psychology, and software engineering. *Psycho-technical* studies mostly translate change(s) introduced by POITI only into change(s) in the way individual "users" use IT, therefore a huge focus in these types of studies is on the concept of "use," on the one hand, and on the notion of "task-technology fit," on the other. The streams of work commonly known as "technology acceptance" and "task-technology fit," consequently, typically fall into this class of IT implementation research. Although this class of IT implementation research pays much more attention (compared to the *psycho-behavioral* class) to IT artifact characteristics or features, one major presumption in this type of research (particularly, in the "technology acceptance" and "task-technology fit" research streams) is still that new IT is a given, pre-determined element.

The *socio-political* class of IT implementation research is represented in a separate column in Figure 1. Studies in this class of research typically have strong roots in sociology and political science. The major tenet for this type of research is a firm

presumption that change(s) introduced by POITI would mostly have a social and political nature. In other words, studies holding the *socio-political* postulate generally view IT implementation occasions as situations where POITI only changes, but does not change because of, the socio-political state of social/organizational settings. In this type of research, therefore, as with the two prior classes, new IT is to a great extent presumed to be a given, pre-determined element.

The next column in Figure 1 is labeled *multilevel*. The term *multilevel* is employed in order to distinguish those studies that strive to investigate the interaction between the human side and the technology side by adopting a multilevel perspective which involves also some other levels of understanding: group level and/or organizational level. In fact, the whole stream of work on *multilevel* theories can be seen as an effort to view organizations as multilevel systems. The notion of "organizations as multilevel systems" is clearly coming from the big movement on conceptualizing and building "general systems theory" (GST) initiated mostly in 1950's. On the other hand, the GST itself has some strong roots in natural-science-type (especially physics and biology) perspectives on what a "system" is and how it must be studied. On this basis, although the espoused theory among *multilevel* researchers is that "as social systems, organizations are qualitatively distinct from living cells and other concrete physical systems" (Kozlowski and Klein, 2000), the theory-in-use among those researchers has an inclination towards viewing organizations in many aspects as being similar to biological and or physical systems. This notion is clear from the fact that one of the highly cited research studies (i.e., Kozlowski and Klein, 2000) on *multilevel* organizational research makes the following argument:

it is noted that open systems counteract the second law of thermodynamics-entropy by importing energy and information from the external environment, and transforming it, to maintain homeostasis. Feedback and servo-mechanisms are the basis for the purposive responses of cybernetic systems. Organizational systems are proposed to have analogous structures and processes (e.g., Katz and Kahn, 1966; Miller, 1978).

The major premise of the *multilevel* perspective, therefore, is that GST has significant heuristic value and it must be employed in order to develop better organizational theories where "micro" and "macro" perspectives on organizational phenomena are integrated. From the perspective of multilevel researchers, it seems completely intuitive (and hence valid) to investigate how the integration/compilation/composition of insular (individual-level) milieux into higher level phenomena creates emergent "wholes" that are greater than the sum of their parts. Such a point of view, in fact, has played a major role in advancing organizational study and in shaping a type of unprecedented systematic viewpoint towards organizational phenomena in the past thirty years.

Finally, the last column in Figure 1 is created to cover those studies that are more focused on investigating socially constructed realities which have their own independent existence and, in terms of their implications for studying people's reactions to IT implementation, are beyond just the aggregation of individual level phenomena/realities. In these studies, there are significant considerations of how certain properties of the context of IT implementation are in mutually constitutive relationships with POITI. Such mutually constitutive relationships in IT implementation research holding the *socio-technical* perspective are generally understood as and called "interactions between the social and the technological." Studies holding the *socio-*

technical perspective, in fact, implicitly or explicitly presume that using the term "interaction" is one of the best ways by which they can distinguish themselves from other types of IT implementation research in which there is no consideration of the fact that POITI in general and new IT in particular can be changed by the agency of certain contextual properties of a given social/organizational setting. Studies in this class of IT implementation research are typically and mostly influenced by such seminal works as Leavitt (1965), Emery and Trist (1969)—i.e., socio-technical systems, and Giddens (1976, 1984)—i.e., structuration theory.

2.5.2. Discussion

It must be acknowledged that the extant literature contains several good and illuminating theoretical accounts that significantly contribute to understanding and explaining how individual and collective reactions to IT implementation emerge and occur. On this basis, it is not the aim of this current research to totally refute the mainstream perspective in the literature; rather, this research accepts that there are several highly insightful and useful perspectives and models in the literature, such as the models presented by Markus (1983) and Lapointe and Rivard (2005). However, there seems still to be a major need to add to, strengthen and build on this literature. For instance, considering the *multilevel* perspective, the position of this present research study is that what in large part is only hinted at or ambiguously defined in the *multilevel* IS research can be fully accounted for using lessons from such fields as sociology and anthropology. In this sense, a sociological/anthropological perspective should not be deemed against the *multilevel* perspective; instead, it should be seen as complementary to it. Although "the roots of the multilevel perspective are spread across different

disciplines and literatures" (Kozlowski and Klein, 2000), there are two concepts that seem not to be articulated well in the *multilevel* IS research: context and emergence. Lessons from sociology/anthropology can be enormously useful in better understanding these two concepts by introducing the technical concept of *social structure* and by bringing in ideas from the literature on *sociological imagination* and *phenomenological sociology*. Additionally, when it comes specifically to the utilization of the *multilevel* approach in "resistance to IT implementation" research, this present research study contributes to the current literature based on the idea that the *socio-technical* perspective is much more relevant and useful in understanding the IS phenomena than is the GST perspective, which is the underlying conception for the *multilevel* approach. Generally, those studies that apply the *multilevel* approach overlook the idea that there is a mutually constitutive relationship among the individual, the social and IT; hence, they typically do not recognize the fact that the IT artifact itself evolves over the course of an IT implementation process.

Considering Figure 1, this present research, therefore, contends that the most appropriate approach towards theorizing reactions to IT implementation is to take the *socio-technical* perspective for looking at both *status-quo-type* and *disruption-type* antecedents. The *socio-technical* perspective is superior to the other perspectives (i.e., the other columns in Figure 1) in that it not only captures both the human side and the technical side of IT implementation occasions, but it also involves the systems perspective, which takes into account recursive and mutually constitutive relationships rather than just one-way relationships. Furthermore, taking the *socio-technical* perspective can significantly contribute to our understanding of mostly unwitting

formation/construction processes of social objects, processes where collective-level entities are much beyond simple bottom-up aggregations of individual-level entities.

From the above explanations, it becomes clear that the cell at the bottom-right corner of Figure 1 is the place where most complete theoretical accounts should be placed. And that cell is, in fact, the place where this current research contends that the research gap in the literature exists. There is only one study (i.e., Jian, 2007) that, even if only partially, satisfies the requirements for being in that "research gap" cell. Jian (2007) pays attention to several important issues, including the socially enacted meanings of technology and the role of organizational history in determining the outcome of IT implementation efforts. As was discussed in section 2.3, Jian (2007, p. 521) views resistance behaviors as "variant ways in which organizational members react to oppositional meanings of ICTs that embody organizational tensions and contradictions." However, one major problem with Jian's (2007) theoretical account is that it focuses only on one socio-political issue in the pre-IT-implementation world, namely, "organizational tensions."

The above discussions seem to indicate that it is not enough only to build or propose another theory or model to fill the research gap shown in Figure 1. Instead, it is evident that there is a major need, in the first place, to define a new theoretical vision which could be able to guide theorizing efforts in this IS research domain. Conforming to such theoretical vision, then, one can build theories that are able to fill the aforementioned research gap by (1) capturing all important stakeholder groups' perspectives and rationales, (2) addressing the enactment process of extra-individual entities and their interaction with the individual realm, (3) drawing a historical scene of

IT implementation occasions, and (4) conceiving and modeling recursive and mutually constitutive relationships. Any type of theory that encompasses these four traits, consequently, will be able to fill the research gap identified in this chapter.

3   RESEARCH DESIGN

3.1. Overview

The main stages of the research design which I am following in this current research can be outlined as follows. Generally, these items show major steps that I take to answer the research questions posed in chapter 1:

- An initial round of literature review where I mostly analyze, synthesize and discuss the extant literature on IT implementation in order to identify the ontological, epistemological and hence theoretical gap that should be filled. The major outcome of this stage is to establish the need for and then to define a new theoretical vision in order to properly study reaction(s) to IT-involved change.

- Studying a historical case of healthcare IT implementation in which all proper ontological, epistemological, methodological and methodical devices are applied in order to gain an interpretive understanding of a real world situation.

- Making a juxtaposition between the gained understandings from the healthcare IT implementation case study and relevant insights/ideas from the literature (not just the IS literature) in order to propose theoretical schemas in a way similar to how Lee and Dennis (2012) do in their paper. Lee and Dennis (2012), in fact, offer a reformulation of a positivist theory that is not the replacement of the original theory, but is rather the positivist theory adjusted and strengthened by

insights from an interpretive perspective. This stage also includes providing prescriptions that follow from that proposed body of theory.

One important point is that the above three steps picture an *abductive inquiry* process (as opposed to an inductive inquiry process). By abductive inquiry process,[1] I refer to a specific reasoning process that was originally proposed by Charles Sanders Peirce (1839-1914). In such a process, "a series of apparently unrelated premises [or insights] is replaced by a single proposition, called the hypothesis [or theory], which brings them all together and explains them" (Waal, 2005). In this present research, such premises (or insights) come from two major sources: the first (i.e., the literature review) and the second (i.e., the case study) stages outlined above.

As was mentioned at the end of chapter 2, a new or alternative theoretical vision is needed. Such an alternative vision can be called *socio-technical systems imagination.* The following section surveys multiple aspects of such a vision. Then, section 3.3 explains several different facets of the research approach employed in this present study. Finally, the last section describes the procedures and practices that will be followed to warrant an adequate level of rigor for the process and product of the *abductive inquiry* design employed in this current research.

3.2. The Socio-Technical Systems Imagination

The notion of *socio-technical systems imagination* is based on what C. Wright Mills (1959) conceptualizes as "sociological imagination." It refers to an essential intellectual quality, the understanding and acquisition of which can lead to building

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[1] See Chapter 1, Section 1.2: Abductive Inquiry Process

better IT implementation theories. Theories that embody the *socio-technical systems imagination* encompass the following criteria, which are mostly extracted from the notions presented by Lee (2004):

- Any given body of theory that strives to understand or explain people's reactions to IT implementation must satisfy the requirements of what is known as *social theory*.[2] According to Lee (2004, pp. 8-10), a *social theory* must satisfy three requirements:

  1. It should satisfy all the same logical and empirical requirements that a natural science theory satisfies. In this dissertation, Popper's (1965) four demarcation conditions are considered for this purpose. So, propositions making up a scientific theory need to (1) exhibit internal logical consistency, (2) be empirically testable, (3) survive attempts at empirical testing and (4) be at least as explanatory or predictive as any rival theory.

  2. It should address both first-level and second-level constructs. In fact, as Lee (2004, p. 8) uses Schutz's (1962) conceptualization to account for the social dimension of social theory, one can conclude that besides being scientific based on the Popperian criteria (or any other demarcation criteria), any social theory should be able to address both "meanings that the observed human individuals create and share, and that they attach to one another, to their organizational setting and to their history" (i.e., first-level constructs), and scholarly or scientific propositions that a researcher makes based on

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[2] See Chapter 1, Section 1.2: Behavioral Theory vs. Social Theory

those first-level constructs (i.e., second-level constructs). Indeed, acknowledging the fact that there are some first-level constructs (subjective meanings) that need to be addressed makes a theory a social theory and distinguishes it from a natural science theory.

3. It should be mostly focused on social objects. As Lee (2004) points out, a social theory needs to be more about shared, socially constructed objects/realities/institutions. This means that the primary unit of analysis that needs to be addressed by social theories goes beyond individuals and should be defined as social objects that enable, constrain and otherwise shape behaviors and thoughts of all different generations of individuals who enter, pass through and leave any given social setting. By considering and focusing on social objects, then, one important ramification emerges as the notion that individuals can be considered as agents who are under the influence of social objects (or structures), and that their thoughts and actions are determined or shaped, in one way or another, by those social entities.

- This second criterion, in fact, explains the reason behind the use of the term "imagination" as part of the phrase *socio-technical systems imagination*. Inspired by C. Wright Mills' (1959) notion of "sociological imagination," this criterion holds that a valid theory about people's reactions to IT implementation should be able to capture the background of individuals (i.e. biography), the background of social structures (i.e. history) and the interaction between these two within a societal context. So, one important thing that any given theory of

reactions to IT implementation must satisfy is drawing a historical scene of the pre-IT-implementation world and connecting it to an analysis of the present organizational world which would be mostly affected by IT implementation. Such a way of theorizing, on the other hand, involves addressing both personal troubles and public issues, and hence warrants a balanced view in building social theories that are neither too social deterministic nor too individualistic.

- This last criterion explains the reason behind the use of the term "socio-technical" as part of the phrase *socio-technical systems imagination*. According to this criterion, a valid theory of reactions to IT implementation must have a systems perspective towards the way that technological aspects interact with social aspects in an IT implementation occasion. Such a systems perspective has historically been conceptualized as the socio-technical systems perspective (cf. Emery and Trist, 1969). Moreover, one major ramification of taking the socio-technical systems perspective (and also the general systems perspective) should be to go beyond considering only one-way relationships between components of a system. On this basis, a body of theory which seeks to explain the nature and mechanisms of people's reactions to IT implementation needs to consider recursive or mutually constitutive relationships, rather than one-way, cause-and-effect ones. On the other hand, only having a systems perspective can enable a body of theory to address the role of different stakeholder groups and their values in what emerges as the process and outcome of IT implementation efforts. For instance, one group of stakeholders that needs special attention is IT implementers (i.e., administrators, CIOs, etc.), who, as Ford et al. (2008, p. 362)

argue, often contribute highly to the occurrence of what they themselves call resistant behaviors through their own actions and inactions, owing to their own ignorance, incompetence or mismanagement.

3.3. Research Approach

This section provides a description of the overall research approach employed in this current study.

3.3.1. Ontology

At the ontological level, the research approach in this study is led by the notion that the "reality" or "nature" of the world where people's reactions to IT implementation arise is much more complex than the one commonly characterized in the literature using the bi-polar continuum of "resistance vs. acceptance." Such a world is being constantly shaped and reshaped on a daily basis while every individual holds his or her own subjective meanings and has his or her everyday life in a workplace dealing with new IT being implemented.

3.3.2. Epistemology

At the epistemological level, the research approach draws primarily on the notion of integrating interpretive and positivist paradigms of research (cf. Lee, 1991). In fact, the whole body of proposed theory in this dissertation research strives to create both understanding and explanation of people's reactions to new information technologies, and this focus on both understanding and explanation is clear in the formulation of the first research question presented in chapter 1. According to Hovorka and Lee (2010), while understanding is the functional outcome of interpretive research, explanation is

the functional outcome of positivist research. This is why this dissertation research is based on an integration of both interpretive and positivist paradigms.

In creating the aforementioned understanding, this dissertation heavily draws on the *social phenomenology* approach, which was first conceptualized and introduced by Alfred Schutz. *Social phenomenology*, as defined in chapter 1, section 1.2, is an interpretive approach towards producing *social theory*. One major tenet of this approach is its focus on the lifeworld or everyday life experience of human subjects. This kind of focus fully fits this study's aim, which is to address personal troubles as part of an effort to create a *sociological imagination* of IT implementation occasions. On the other hand, the phenomenological aspect of the *social phenomenology* approach enables this current piece of research to transform the mainstream resistance to IT literature by observing a range of different technology experiences that people live through (for example, see Riemer and Johnston, 2012), experiences that are not just limited to resisting IT. In this sense, this dissertation argues against the common belief that one major critique of phenomenological studies is that they do not "appear able to explain why some technologies become accepted and used rather than others in the way social constructivist accounts do" (Introna, 2005). Indeed, if we look at the history of phenomenology as well as of sociology, we can easily realize that taking the phenomenological approach towards studying sociological problems was a major cornerstone for social constructivist ideas (for example, Peter L. Berger and Thomas Luckmann were highly influenced by Alfred Schutz).

3.3.3. Methodology

At the methodological level, the research approach in this dissertation is the case study (Lee, 1989). From considering different parts of the IS literature (e.g., Markus, 1983; Hirschheim and Newman, 1991), it can be concluded that the case study methodology provides good flexibility to conduct research based on either positivist or interpretive paradigms, or even based on the integration of both of them. Therefore, the case study methodology is ideal in this current research, where an integration of interpretive and positivist approaches is sought for.

More specifically speaking, the methodology employed in this research is a specific mode of case study approach—i.e., a historical interpretive case study based on a systems perspective. On other hand, since this present research uses a single case study, it should be noted that in conducting *abductive inquiries* while doing one case study does not hurt, doing multiple case studies also does not help and does not add any more value. On the other hand, doing a single case study in this research is similar to what is done in some other studies (such as Lee and Dennis, 2012), where one single case study has been sufficient to generate an interpretive understanding.

In terms of being historical, the case study is focused on a real world experience of healthcare IT implementation that has already occurred in a university hospital. On the other hand, the necessity of taking an interpretive approach in doing a case study in this research follows from its epistemology as explained in the previous part. On the other hand, the necessity of taking the systems perspective stems from two concerns: one, conforming to the *socio-technical systems imagination* framework and, two, considering the specific empirical context of this dissertation, which is health care. In

fact, according to the explanations provided in chapter 1, it should be clear that several different complexities and dynamics that healthcare settings typically entail, such as the role of regulatory bodies and governments in directing and administering the big picture of health care in countries such as the United States, necessitate taking a systematic approach and perspective that would enable researchers to catch all important concerns and stories shared by all important stakeholders involved in a given healthcare IT implementation project.

3.3.4. Methods

For addressing all of the aforementioned ontological, epistemological, and methodological concerns, this dissertation uses two major methods for gathering data: conducting interviews and obtaining documentary evidence.

The *active interview* approach has been followed for the interviews in this dissertation. The *active interview* approach is in contrast to the conventional interview approach. The conventional interviewing approach reveals how the positivist school of thought treats human subjects as natural objects that are repositories of various sorts of knowledge or facts. The positivist perspective presumes that the interviewer (or researcher) is a neutral agent who tries to make the respondent a neutral agent too; so, both sides of the interview will be neutral agents ready to establish some sort of knowledge transmission pipeline. In this sense, human subjects who take part in interviews are basically conceived as passive vessels of answers (Holstein and Gubrium, 1995, pp. 4, 7-8). Therefore, in the conventional approach to interviewing, the subjects are epistemologically passive, not engaged in the production of knowledge. Hence, positivist interviewers persistently ignore the most fundamental of epistemological

questions: where does this knowledge come from, and how is it derived? (Holstein and Gubrium, 1995, p. 2). However, on the other side, the *active interview* approach, which is based mainly on the interpretive school of thought, assumes an interview to be an interactional event. In this sense, treating interviewing as a social encounter leads to the notion that an interview is not merely a neutral conduit or source of distortion but rather the productive site of knowledge (Holstein and Gubrium, 1995, p. 3). According to the *active interview* perspective, all interviews are reality-constructing, meaning-making occasions, whether recognized as such or not (Holstein and Gubrium, 1995, p. 4). Hence, the process of meaning production is as important for social research as the meaning that is produced. Therefore, there are two important aspects in this approach: the process of meaning-making (i.e., interpretation) and the content (i.e., substance). These two aspects introduce two kinds of communicative contingencies which influence construction of an active subject who exists behind the respondent (Holstein and Gubrium, 1995, p. 14). On this basis, this approach distinguishes three agents in any given interview occasion: interviewer, respondent and human subject. The human subject is not predefined but is constructed in relation to the ongoing communicative contingencies of the interview process (Holstein and Gubrium, 1995, p. 14). In this line, the *active interview* is a kind of limited "improvisation" performance. The production of knowledge and/or meaning is spontaneous, yet structured—focused within the loose parameters provided by the interviewer (Holstein and Gubrium, 1995, p. 17). Moreover, in the *active interview* perspective, the objective is not to dictate interpretation but to provide an environment conducive to the production of meanings that address relevant

issues, and not be confined by predetermined agendas (Holstein and Gubrium, 1995, p. 17).

Other than the general approach/style for interviewing people in this research, which is the *active interview*, another issue is designing an interview protocol. As a major part of this study's interview protocol, the following table is used to organize interview questions. Two major notions drove the idea of designing the following table: one is making a distinction between first-level constructs (i.e., related to the natural attitude of the everyday life of interviewees) and second-level constructs (i.e., related to the researcher's own scientific attitude) when formulating interview questions; and the other is conforming to the *socio-technical systems imagination* theoretical vision by asking a range of different questions that would cover all aspects of this vision. Another point is that the proposed interview questions are only some opening questions: for in triggering interviewees to answer the questions, there will need to be to follow up with spontaneous questions that would capture the meanings interviewees will create during the interview time.

Table 1: Sample Interview Questions

scientific attitude vs. *natural attitude* / *socio-technical systems imagination* concerns	*scientific attitude* concerns	sample interview questions (stated in *natural attitude*)
Focusing on social objects	"drawing a cultural, social structural, and political scene"	A lot of healthcare professionals think of their careers as having had a particular up and down course in terms of the level of autonomy and discretion they experience in their workplace. How do you see your career here compared to other places you've worked before? Do you experience a higher level of autonomy and discretion here? Who, or what groups, do you work well with here? To whom, or what groups, do you report here? Could you tell me about a recent case where there were some serious disputes or disagreements about determining the person who needs to decide about the right measures for assessing the hospital's performance? How were those disputes settled? Might your job priorities here change with changing the hospital's administration?
Creating/provoking sociological imagination	"drawing a historical socio-technical scene"	How long have you been here? Has the new X system made things smoother than before? Why? Could you give me an abstract history of different IT tools that you have been using here before the X system? What was your feeling about using those systems? How has the role of the IT changed or remained the same in your time in this hospital? Did any of your job priorities change with introducing the X

scientific attitude vs. natural attitude / socio-technical systems imagination concerns	scientific attitude concerns	sample interview questions (stated in natural attitude)
		system?
Having systems perspective	• socio-technical concerns • recursive relationships • different stakeholder groups and their values	In general, what do you consider to be (or should be) the main function(s) of IT in healthcare settings?
		Do you care about having and or using the most advanced IT in this workplace? Why?
		Could you tell me an important lesson you've learned in this workplace about how people use IT?
		Do you think that information technology has sufficiently been used for improvement purposes in this hospital? Do you think it is enough? If no, can you think of further exploitations of IT in this hospital? What would be those?
		Now let's talk about the X system. As you know, I am not a healthcare professional and I have never been using a system like the X system, so I don't have much of an idea what it is like. Could you kind of walk me through major things that you were doing with the system? And what was it like?
		What would I notice if I used the system for the first time?
		Could you describe a typical day when you were using the X system?
		With what parts of the hospital did you need to collaborate and how did the X system help or didn't help you to do the collaboration?
		Do you think that the use of the X system was a support for the hospital's goals? If so, what were

scientific attitude vs. natural attitude / socio-technical systems imagination concerns	scientific attitude concerns	sample interview questions (stated in *natural attitude*)
		those specific parts of the system that were making it supportive to the hospital's goals?
		Were there any counterproductive parts in the X system? Specifically, what were those parts?
		Who, or what groups, do you think benefited the most from implementing the X system? Why?

The formulation of this study's interview questions (of which a sample is shown in the above table) was inspired by the insights and practices offered by Peter Checkland in his conceptualizations of *Analyses Two and Three* (cf. Checkland, 2000), and by Spradley (1979) in his book *The Ethnographic Interview*. On one hand, Checkland (2000) talks about doing *Analyses Two and Three* for the sake of understanding social and political aspects of a given context, finding out how the social reality in that context is being continuously constructed and reconstructed, and taking the issues related to distribution of power into account. On the other hand, Spradley (1979) talks about different types of interview questions (i.e. descriptive, structural and contrast), which can be used to draw the cultural scene of a cultural domain or context.

The last matter in terms of the methods employed in this dissertation pertains to data analysis methods. Although as Rodwell (1998, p. 147) contends, data analysis in studies with an interpretive aspect can be an ongoing process starting with the first contact in the field, a more formal data analysis is undertaken when focused data

collection ceases. In this sense, the formal data analysis in this dissertation is driven by the constant comparison mindset (cf. Glaser and Strauss, 1967; Corbin and Strauss, 2008). The technique involves three types of qualitative data coding: open, axial and selective. "Open coding labels 'chunks' of data according to categories; axial coding places these categories in relationship within a framework of conditions, context, action/interactional strategies, and consequences; and selective coding determines the core categories around which all the other categories are integrated in order to develop a clear analytic story line which is the precursor to a theory" (Rodwell, 1998, p. 154).

3.4. Aspects of Rigor

This section goes over several different practices and mechanisms that are employed in order to warrant that the process and product of the theory building enterprise in this current research study are adequately rigorous. Since the theory building effort employed entails making understanding (i.e. the functional outcome of interpretive research) as well as explanation (i.e. the functional outcome of positivist research), the rigor criteria presented hereafter draw insights from two separate sources. On the one hand, Lincoln and Guba (1986) and Rodwell (1998) are used chiefly to set rigor criteria for the process and product of the interpretive research side. On the other hand, Lee (1991) is used mainly to set rigor criteria for the positivist theory (i.e. explanations and prescriptions), which will be created on top of the interpretive understanding.

According to Lincoln and Guba (1986, pp. 18-19) and Rodwell (1998, pp. 98-106), the following criteria and practices can be used for judging and warranting formative validity in interpretive studies:

- Credibility (as an analog to internal validity): As Rodwell (1998, p. 98) points out, "this dimension of rigor attends to the 'truth' value of the findings … it also speaks to the accuracy of the results and interpretations as viewed by important stakeholders in the context." The following practices, based on what Lincoln and Guba (1986) and Rodwell (1998) suggest, are pursued in the present research study in order to warrant credibility:
  - Prolonged Engagement: Lengthy and intensive contact with the healthcare IT implementation phenomenon and the research participants in the field;
  - Persistent Observation: In-depth pursuit of those elements found to be especially salient through prolonged engagement;
  - Triangulation: Cross-checking of the case study data by use of different data sources (i.e., gatekeepers, research participants, and documentary evidence), and methods (i.e., interviewing, observing, reviewing the documentary evidence);
  - Member Checks: Continuous, informal testing of the gathered data by soliciting reactions of research participants to what other participants or data sources have offered, and also by utilizing the "hermeneutic circle," which is explained in detail in the next pages.
- Dependability (as an analog to reliability): As Rodwell (1998, p. 99) describes it, this criterion "speaks to the point that all procedures employed to collect, analyze, and interpret data fall within the expectations of [interpretive] research practices." Rodwell (1998, p. 100) suggests that to warrant this aspect of rigor, it is required that, besides doing triangulation, all records of all collected and

analyzed data as well as formed categories and category labels be kept. Moreover, all methodological steps and decisions, all raw data and all linkages between raw data and other forms of analyzed data (such as basic categories and high level categories) should be recorded and kept.

- Confirmability (as an analog to objectivity): As Rodwell (1998, p. 100) argues, "the point of [this criterion] is to assert the reasonableness of the inferences and the logic of the theory that evolved from the data." For Rodwell (1998, pp. 100-101), the confirmability audit can be done on the basis of the kinds of evidence that can be found in an interpretive research, including triangulation, records of collected and analyzed data, formed categories, as well as interpretations and lessons learned.

- Transferability (as an analog to external validity): As Rodwell (1998, p. 101) says, this criterion "allows for the possibility that information created and lessons learned in one context can have meaning and usefulness in another." The major practice suggested by Lincoln and Guba (1986, p. 19) to warrant transferability is providing thick descriptive data, which is "narrative developed about the context so that judgments about the degree of fit or similarity may be made by others who may wish to apply all or part of the findings elsewhere."

For judging the summative validity aspect of the interpretive understanding generated in this current research (and also for conducting member checks), the "hermeneutic circle" approach is utilized. The "hermeneutic circle," actually, can be thought of as a cycle of inquiry that is common across positivist, action, design and interpretive research studies. According to Føllesdal (1994, p. 233), "the hermeneutic

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[circle] method is the hypothetico-deductive method applied to meaningful material (texts, works of art, actions, etc.)." In this sense, as Sarker and Lee (2006) talk about the "hermeneutic circle," it is a "device of mind" that allows the reader (or the researcher) of the meaningful material to comprehend the parts of that material in terms of the whole, and the whole in terms of the parts. Therefore,

> the hermeneutic circle [involves] several circular passes around the text [or the meaningful material], with each such iteration ending with a different understanding and also a different puzzle, thus bringing a different set of texts to our (i.e., the researchers') focus. Broadly speaking, each pass through the hermeneutic circle [involves] four (though not strictly sequential) steps: first, the identification of interpretive breakdowns, resulting from a contradiction between what we already understand (sometimes this is called the "preunderstanding") and what we actually observe; second, the examination of new data relevant to the breakdown being investigated and/or the reexamination (in a new light) of data examined in a previous iteration; third, the surfacing of questionable assumptions we had made earlier that contributed to the breakdown in our understanding; and fourth, our revision of the existing interpretation to resolve the breakdown. (Sarker and Lee, 2006, p. 137)

According to Lee (1991, p. 352-353), there can be some tests in order to validate a positivist account built upon an interpretive understanding. Based on what is stated in Lee (1991), the first test here addresses the formative validity aspect and the second addresses the summative validity aspect:

- One test is for use by the organizational researcher who is in the process of formulating a positivist understanding. In this test, the researcher simply makes sure that the subjective meanings, earlier recorded in the interpretive understanding, have been built into the positivist (or explanatory) model. To accomplish this, the researcher refers back to the subjective meanings and objective documentary evidence earlier recorded that have already undergone cross-checking and member checking. In other words, in this kind of test, there is

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no need to share the positivist (or explanatory) model (i.e., the "second-level construct" according to Schutz [1962] or "second-order concept" according to Van Maanen [1979]) with research participants, as it is clear that this model is relevant primarily to the world of the researcher, not the researched (see Van Maanen, 1979).

- Another test has the purpose of testing the positivist theoretical explanations and prescriptions through controlled empirical experiments or via postdiction. This current research study employs the postdiction approach.

4 A CASE STUDY OF HEALTHCARE IT IMPLEMENTATION

4.1. Introduction

Following what was stated in chapter 3 in terms of integrating interpretive and positivist approaches to build a body of theory based on what is presented in Lee (1991), this chapter mainly addresses the "subjective understanding" level through elaborating on a case of healthcare IT implementation. As Lee (1991, p. 351) explains, the understanding at the subjective level belongs to the observed human subjects or research participants. In the case of this research study, the subjective level of understanding would portray human subjects' lived experiences and shared meanings about a specific healthcare IT implementation and use case. On this basis, this current chapter will use documentary evidence and interview data to show how people involved in a healthcare IT implementation case make the case and all incidents related to it meaningful for themselves. At the same time, this chapter avoids for the most part judging those people's statements or expressions.

The remainder of this chapter proceeds as follows. The next section will describe different aspects of the case study design along with the protocol that was followed to conduct the study. The third section of this chapter will go over some contextual and background information on the specific healthcare IT implementation case studied, mostly using gathered documentary evidence. The fourth section will narrate the case

story using a number of quotations and notes from the interviews conducted with research participants. Finally, the last section provides a summary of the case story.

4.2. The Case Study Design and Protocol

Two major methods were used to gather data in this case study. One was obtaining documentary evidence and the other was interviewing people who played different roles in the healthcare IT implementation case.

The first contact in this case study was made with the project manager to obtain documentation related to the project. More than 60 items, including meeting agendas and minutes, emails, reports, and software tool screenshots, were obtained and reviewed.

Potential participants (human subjects) were identified after an initial review of the project's documentation and two meetings with the project manager. The project manager, as the main gatekeeper, was the first person to contact some of the first potential participants; and the rest of the recruiting process continued using a mixture of "gatekeeper" and "snowballing" methods. During the recruitment process and before recruiting each human subject, the project manager or one of the already recruited participants would make the initial contact with the identified potential participant. During this initial contact a recruitment script was used to inform the potential participant about this research project and to see if he or she would like to hear more about the project. Those individuals who were interested, then, were asked to sign a Release of Information Form which would allow the researcher to have their names and contact information and make the recruitment contact. During the recruitment, each

participant was given a consent form by email or in person. Finally, each participant would sign the consent form before or during a one-on-one interview session.

The interviews were conducted with 18 different actors who played different roles, such as chief medical information officer (CMIO), implementation director, project manager, physician, nurse or clinical informaticist. The average interview time was about 1 hour, and interview notes were taken during and/or after the interviews. In some cases, there were also follow-up email exchanges with interviewees to clarify some points and issues raised during talking with them. All interviews were tape-recorded and all important parts of the interviews were transcribed. For narrating the case story, the interview data were coded by the names of participants in "A#" format, where A stands for "Actor" and "#" refers back to the number of that actor in a confidential list of actors.

In terms of interview questions, the procedures for conducting ethnographic interviews (Spradley, 1979) as well as active interviews (Holstein and Gubrium, 1995) were generally followed. The interviews were structured around a common set of open-ended questions along with some evolving probing sub-questions. The sub-questions evolved interview by interview in a way that would reflect and address the researcher's most recent version of understanding the case and would help to clarify more issues and inconsistencies related to that version of understanding. All interview questions and sub-questions, as meaning-making triggers in an active interview sense, were aimed at learning about actors' lived experiences during pre-implementation, implementation and post-implementation time episodes and the nature of their interpersonal relationships with other actors. Actors were also asked to provide explanations as

responses to other types of questions, which were very useful in learning about people's general and case-specific socio-structural roles and the cultural domain they live in. Some grand tour questions were also posed (Spradley, 1979), questions such as "May I ask you how long you have been here?" or "How do you basically see the difference between nursing informaticists and physician informaticists in this university health system?" Grand tour questions allowed me to go deeper with some more mini-tour questions (Spradley, 1979) to get details about specific events and participants' experience of them. For example, mini-tour questions such as "How did the level and scope of your involvement change during the second round of implementation?" or "Do you think the second version of the system is good or is it just adequate? Why?" were posed.

4.3. The Case Context and Background

In 2009, a university health system started a project called Ambulatory Electronic Health Records (AEHR). The main purpose of the project was to bring EHR capabilities including e-prescription, electronic messaging and patient charting (documentation) to the out-patient (clinical) side of the university health system by using software tools provided by the company Cerner™. Prior to the project, most parts of the clinical workflows were based on using paper, especially for the patient charting (documentation) workflows.

In 2010, the most important phase of the project started with the idea of converting the patient charting (documentation) workspace from paper to electronic. This phase of the project was named "Phase 2." During "Phase 2," around 65+ clinics of the university health system were classified into different groups and were scheduled to

go-live with the new system at different times. The main idea behind the grouping initiative was to do the roll-out for the most similar clinics (similar in terms of their workflows) during the same time period.

The main responsible organizational unit for the AEHR project was an office inside the university health system IS area called Office of Clinical Transformation (OCT). As is shown in Figure 2, OCT reports to the CMIO of the university health system; and the CMIO, in turn, reports to the CIO of the university health system, who is also the vice president of the university health system. The main units and departments involved in the AEHR project are depicted with red boxes in Figure 2. One important point about the organizational chart in Figure 2 is that the CNIO (chief nursing informatics officer) position is under revision, the position title might change in the future, and the last person who held the position is now retired. That is why the CNIO box is shown in gray. Another point related to Figure 2 is that, during the AEHR project, nurse informaticists were partially reporting to the CMIO, and this is shown in the organizational chart by a dotted line. And the last issue worth noting is the power differences among different roles across different departments that are shown by certain vertical positions of the boxes. For example, as it is understood from the interviews and the documentation related to this project, while the applications analysts exercise less power than the AEHR project manager, they exercise more power compared to the clinical transformation support people. That is why the box for applications analysts is vertically located somewhere between the two boxes for the project manager and the clinical transformation support.
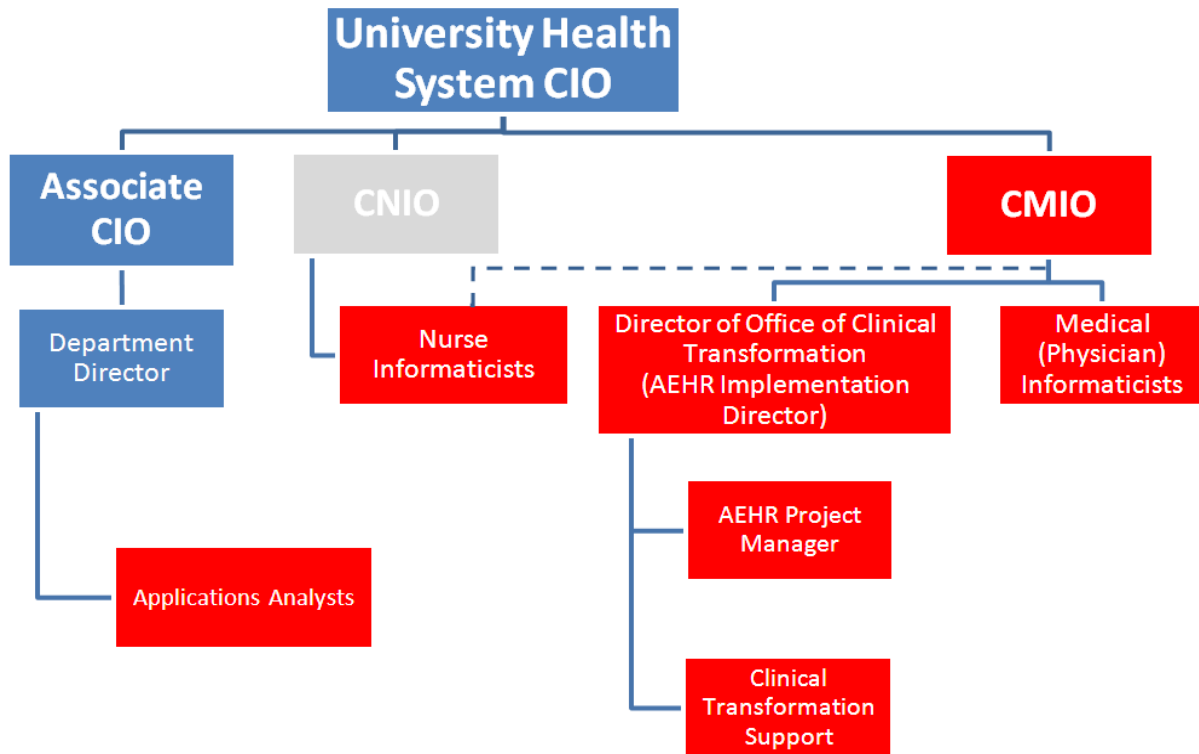
Figure 2: A View of the Organizational Chart of the University Health System IS Area

In terms of the specific implementation environment that this case study is concerned about, the department of Obstetrics and Gynecology (OB/GYN) should be introduced here. In fact, this present case study was conducted on the patient charting (documentation) system implementation efforts at two clinics associated with the OB/GYN department. More specifically, this present case study focuses on the system implementation efforts in the clinical OB side of the department rather than the clinical GYN side. Two out of five divisions (General Obstetrics and Gynecology and Maternal-Fetal Medicine) in the OB/GYN department mainly provide the clinical OB care services; and those two divisions, along with the department chair, were highly involved in the specific case of healthcare IT implementation studied in this present research. As

can be seen in Figure 3, the two divisions along with the department chair level are depicted in red.
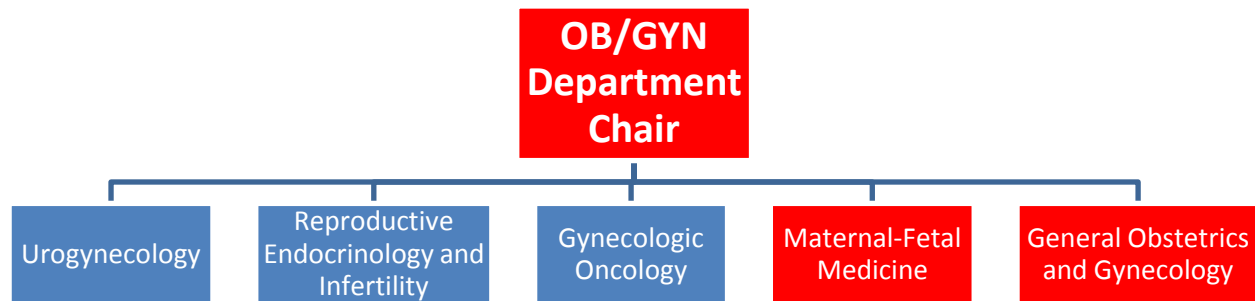
Figure 3: A View of the OB/GYN Department's Organizational Chart

In terms of the software tools' specifications and their use background in this university health system, there are some points that need to be explained. The software tools that OCT decided to implement for AEHR were provided by Cerner™. In fact, the university health system under study has been a loyal customer of Cerner™ since 2004 when the in-patient side of the university health system went live using the Cerner™ PowerChart® tool. Then, in 2009, OCT decided to expand the use of Cerner™ PowerChart® to the clinical (out-patient) side. Finally, in 2010, "Phase 2" started, and the configuration of patient documentation software tools in that phase was composed of three main elements (see Figure 4).
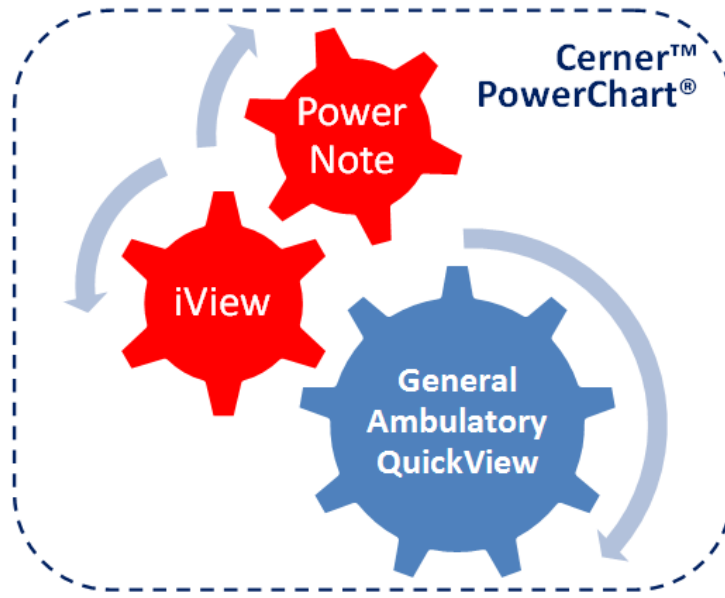
Figure 4: A Schematic View of the Proposed Design for AEHR Phase 2

One element is called iView (interactive View), which is basically a data entry screen (and that is why it is shown in red in Figure 4), and, by default, should be used by nursing staff to document (to chart) patients' different types of data, such as blood pressure, weight, disease history, etc. The use of the iView component is critical especially during patients' first visits, and hence the OCT team decided to create customized iView pages for each and every medical department.

Figure 5: The iView Data Entry Screen for OB Clinic Providers

While the iView screen provides a basic capability for physicians to write their clinical notes, another more advanced tool can be used by physicians to make clinical notes. This other tool is called PowerNote, and one of its important features is that physicians can create and keep their own templates for writing notes, templates that could be customized according to physicians' needs in any specific medical area/discipline. Also, the note templates can be pre-populated using data coming from the iView tool before physicians start writing their notes. This feature is presumed by Cerner™ and the OCT team to be a form of productivity to generate comprehensive yet easy-to-complete clinical notes. The third component is called QuickView, or M-page, as Cerner™ likes to call it. The QuickView page basically functions as a summary or

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dashboard or output page (and that is why it is shown in blue in Figure 4) which displays all the patient-related data coming from different sources, including iView and laboratory sections. In regard to the QuickView page, the OCT team had decided that all clinics should use the same general ambulatory QuickView. So, initially, in 2010, when "Phase 2" started, OCT had made no decision to design medical-discipline-specific QuickView pages.

Figure 6: The OB QuickView Page (Designed During the Second Roll-Out)

Another piece of evidence that must be presented is the information about different roles and the number of role holders who participated in the current case study. Table 2 shows the different types of roles along with the number of participant(s) holding each role as well as role descriptions. As was mentioned before, the total number of this study's participants was 18. As can be seen in Table 2, more focus is put on OB/GYN physicians because they were the users who had a very significant role in

the OB AEHR "Phase 2" project in terms of its dynamics over 2 years of implementation

effort.

Table 2: The Classification of the Case Study Participants' Roles

Role Name	Number of Participating Role Holder(s)	Role Description
Chief Medical Information Officer (CMIO)	1	responsible for leading medical informatics projects and initiatives, especially clinical informatics initiatives
Director of Office of Clinical Transformation (AEHR Implementation Director)	1	responsible for directing the AEHR project in terms of laying out the general road map and phasing of the project
AEHR Project Manager	1	responsible for the whole AEHR project in terms of achieving the project's goals for making all clinical prescription, messaging and charting workflows electronic, considering time, human resource and budget constraints
Applications Analyst	1	responsible for all software programming, configuration, and pre-testing based on specified design specifications provided by physician and nurse informaticists
Medical (Physician) Informaticist	2	responsible for translating clinical needs into design specifications while generally exercising more negotiating power (compared to the nurse informaticist role) in order to adjust the clinical needs coming from the providers' side
Nurse Informaticist	2	responsible for translating clinical needs into design specifications while generally exercising less negotiating power (compared to the physician informaticist role) in order to adjust the clinical needs coming from the providers' side
Clinical Transformation Support	1	responsible for training and supporting clinical users during their use of ambulatory software tools
OB/GYN Department Chair	1	responsible for directing the OB/GYN medical department in all aspects of medical care, research, education and residency program, and practice sites (or clinics)
OB/GYN Physician	7	responsible for doing practice, research and education in the field of OB/GYN (some of the OB/GYN physicians also have division director roles, while some others are directors of a clinic or the residency program)
OB/GYN Clinical Nurse	1	responsible for nursing care at one of the OB/GYN clinics

The last piece of evidence in this section pertains to giving a listing of some of the

most important documents that were obtained and reviewed in this current case study.

The following table provides that list.

Table 3: A List of the Most Important Case Study Documents Obtained and Reviewed

AEHR Phase 2 Expectations Agreement_ Women's Health
AEHR Ph 2 kick off meeting agenda
Phase 2 implementation Women's Health
Phase II Kick Off Meeting Agenda - Women's Health
20110517 AEHR Ph 2 for OB Final Review
20110524 AEHR Ph 2 for OB Final Review II
Women's Health_Go Live Date Posters
Introduction with A1 (meeting agenda)
Fw_ Temporary suspension of EMR use for prenatal patients (email document)
20111108 OB meeting notes
OB 30 Day Review
OB Clinic Issues and Change Requests
The University Health System's Information System's 2013 Annual Report

4.4. The Case Story

The whole storyline is structured around an understanding of the lifetime of the OB AEHR "Phase 2" project. This understanding is reflected in a timeline of events, as shown in Figure 7. The timeline is crafted primarily using documentary evidence related to the OB AEHR "Phase 2" project. As the timeline reveals, the OB AEHR "Phase 2" project, as part of the "Phase 2" health-system-wide implementation, started in September 2010 and ended in September 2012. Only the most important incidents and milestones are displayed on the timeline. There were three very important milestones during the lifetime of this project. The first pertains to the first go-live date on July 13, 2011, when the first version of the OB ambulatory documentation system was announced to be ready for use (the yellow box). Only about six weeks after this initial go-live date, A1, as the department chair, sent an email to all key actors involved in the project to suspend the use of the system. The email and the consequent suspension happened on August 24, 2011 and are shown by the red box on the timeline. After the suspension, it took more than one year for the OB department to have their second-

version system ready to use. The second-version system went live on September 18, 2012, and this event is shown by the green box on the timeline.

Each of the next five sub-sections will narrate one of the time episodes related to the OB AEHR "Phase 2" project; and finally, sub-section 4.4.6 reflects on the participants' lessons learned from the project.
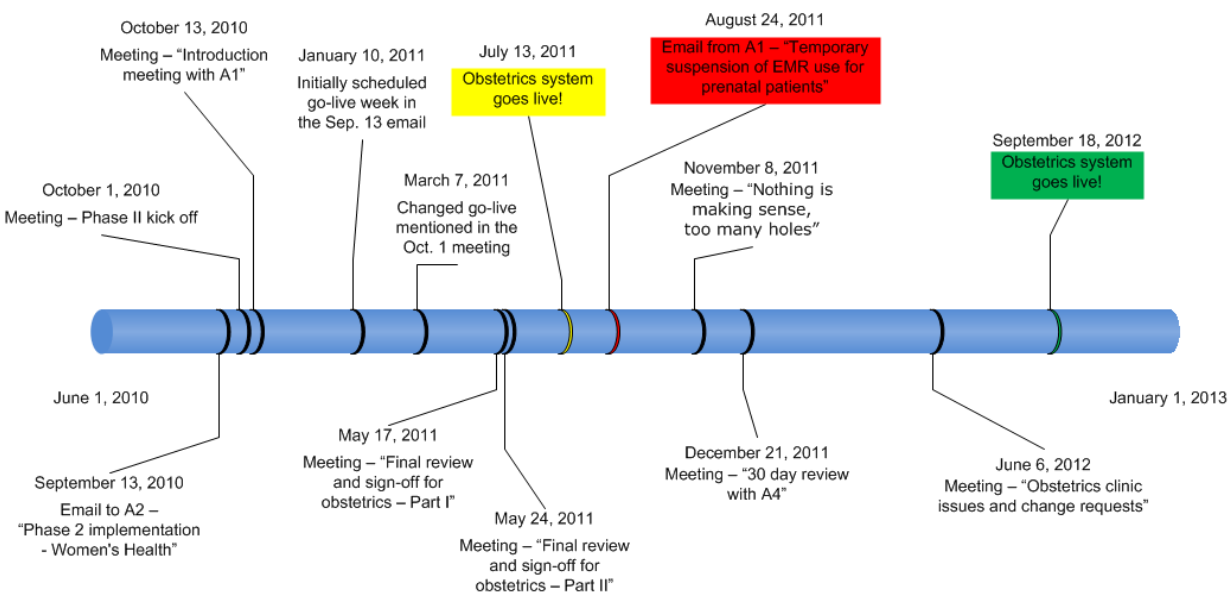
Figure 7: The Timeline of Events during the OB AEHR Project

4.4.1. Episode One – The Pre-Implementation OB Ambulatory World

Prior to the OB AEHR "Phase 2" project, which was aimed at converting the clinical patient documentation from paper to electronic, the OB clinical workflow was vastly shaped around the use of a series of forms called American Congress of Obstetricians and Gynecologists (ACOG) Antepartum Record, or as OB providers tend to call it: ACOG flow sheets. There are different formats of the ACOG flow sheets, but most OB providers use either the three-page or the six-page format. Each page is actually a form designed to keep certain types of data about OB patients as they would have been taken care of over a period of, normally, 40 weeks with multiple visits. Figure

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8 shows Form A (or page 1) as part of the six-page format. A1, the OB/GYN department

chair, describes the ACOG flow sheets like this:

> A true method that had worked for decades … Prenatal charts were designed from long evolution and long experience in approximately three very structured pages that people were very used to looking at…. You can complete them very rapidly for normal pregnancies. And where you [have] them, you know, if somebody walked into labor and delivery in an emergency, you could pull the important things out of that note, you know, in the time that took it walking to the patient's room holding the chart.

In this sense, the ACOG flow sheets had been intended to be the single point of

reference for entering and viewing data about OB patients and also for giving a

dashboard-like longitudinal view of OB patients' health status to OB nurses and doctors.

In fact, as A3, one of the OB physicians, points out: "Each OB visit can't be a standalone

episode. It has to be within the context."

From the OB providers' standpoint, however, giving the longitudinal perspective

was not the only advantage of the ACOG flow sheets. The nature of work at all clinical

settings and especially at OB clinics is highly dependent on the concept of "speed." The

flow of patients must remain fast because physicians need to visit many patients. A13,

an OB physician, in this regard, says: "Speed, speed, it's all about speed. We have got to

see patients quickly…. It's about finding information quickly. It's about documenting

quickly and efficiently." And the ACOG flow sheets had a very significant role in keeping

OB clinical workflows fast and efficient. In fact, as A1 says: "I mean, you know, you

could see patients every 10 minutes cause you could do your charting for a non-

complicated visit in about a minute." A4, another OB physician, adds:

> Well, it's very quick. And it was [uh] easy. [um] The, so from a documentation standpoint, it was easy on the clinician to convey very succinctly good information, and to have a nice flowchart and representation of the patients' care.

In terms of the ACOG flow sheets' being an efficient way of conducting clinical care, A13, an OB physician, adds this: "You don't have a lot of empty blanks to fill in. You write what's pertinent and you're done. So the notes tended to be briefer and they took less time."

DATE _____

NAME _____
LAST   FIRST   MIDDLE

ID# _____   HOSPITAL OF DELIVERY _____

NEWBORN'S PHYSICIAN _____   REFERRED BY _____

FINAL EDD _____   PRIMARY PROVIDER/GROUP _____

BIRTHDATE	AGE	RACE	MARITAL STATUS S M W D SEP	ADDRESS

OCCUPATION — ☐ HOMEMAKER ☐ OUTSIDE WORK ☐ STUDENT Type of Work | EDUCATION (LAST GRADE COMPLETED) | ZIP INSURANCE CARRIER/MEDICAID # | PHONE (H) (O)

HUSBAND/FATHER OF BABY | PHONE | EMERGENCY CONTACT | PHONE

TOTAL PREG	FULL TERM	PREMATURE	AB. INDUCED	AB. SPONTANEOUS	MULTIPLE BIRTHS	ECTOPICS	LIVING

MENSTRUAL HISTORY

LMP ☐DEFINITE ☐APPROXIMATE (MONTH KNOWN) ☐UNKNOWN ☐NORMAL AMOUNT/DURATION ☐FINAL _____ MENES MONTHLY ☐YES ☐NO PRIOR MENES _____ DATE FREQUENCY: Q ___ DAYS ONBCPAT CONCEPT. ☐YES ☐NO MENARCHE ____ (AGE ONSET) hCG+ ___ / ___ / ___

PAST PREGNANCIES (LAST SIX)

DATE MONTH/YEAR	GA WEEKS	LENGTH OF LABOR	BIRTH WEIGHT	SEX M/F	TYPE DELIVERY	ANES	PLACE OF DELIVERY	PRETERM LABOR YES/NO	COMMENTS/COMPLICATIONS

PAST MEDICAL HISTORY

	O Neg +Pos	DETAIL POSITIVE REMARKS INCLUDE DATE & TREATMENT		O Neg +Pos	DETAIL POSITIVE REMARKS INCLUDE DATE & TREATMENT
1. DIABETES			16. D(Rh) SENSITIZED		
2. HYPERTENSION			17. PULMONARY (TB, ASTHMA)		
3. HEART DISEASE			18. ALLERGIES (DRUGS)		
4. AUTOIMMUNE DISORDER			19. BREAST		
5. KIDNEY DISEASE/UTI			20. GYN SURGERY		
6. NEUROLOGIC/EPILEPSY					
7. PSYCHIATRIC					
8. HEPATITIS/LIVER DISEASE			21. OPERATION/HOSPITALIZATIONS (YEAR & REASON)		
9. VARICOSITIES/PHLEBITIS					
10. THYROID DYSFUNCTION					
11. TRAUMA/DOMESTIC VIOLENCE			22. ANESTHETIC COMPLICATIONS		
12. HISTORY OF BLOOD TRANSFUS			23. HISTORY OF ABNORMAL PAP		
	AMT/DAY PREPREG / AMT/DAY PREPREG / #YEARS USE		24. UTERINE ANOMALY/DES		
13. TOBACCO			25. INFERTILITY		
14. ALCOHOL			26. RELEVANT FAMILY HISTORY		
15. STREET DRUGS			27. OTHER		

COMMENTS: _____

_____

_____

The American College of Obstetricians and Gynecologists 409 12th Street SW PO Box 96920 Washington DC 20090-6920

ACOG ANTEPARTUM RECORD (FORM A)

Figure 8: The ACOG Antepartum Record (Form A in the Six-Page Format)

All the characteristics explained above had made the ACOG flow sheets the central part of the OB clinical workflow. Even people at the OCT came to this understanding at

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some point of time. For instance, A5, the OCT's director, mentions: "That piece of paper was gold to them. That was the gold standard to them, that ACOG flow sheet."

However, the pre-implementation OB ambulatory world had one other aspect, and that is related to the tradition of using computer software tools in that clinical setting. In fact, although the ACOG flow sheets had been at the center of OB clinical workflow, the use of Cerner™ PowerChart® was the main way the OB clinics were electronically connected to the rest of the university health system. As A18, an OB clinic nurse, points out, "there was computers we were entering orders, you know, like lab orders … on a system." Indeed, the OB clinical users were using the Cerner™ PowerChart® tool to retrieve lab and diagnostic results and view in-patient charts. Moreover, at that time clerks would have entered orders into PowerChart® from providers' hand-written orders. A more complete picture of this process is given by A5, the OCT's director:

> When you [went] in, they documented what, what they care of the, [they're providing], then when they wanted orders, they would take an order sheet of paper, pre-printed, I have one similar in my bag, [um] check, check, check, what they wanted, [um] I want to see the patient back in whatever time, they hand that to the front desk, the front desk then enters those orders into Cerner, Cerner then results those orders in Cerner, […] the lab use Cerner, and then, so they would have those results in Cerner. Sometimes I think they copied those into the paper chart but I can't remember exactly how they did that, may have printed them or may have copied them. That's how they lived.… They scanned, they faxed, sorry, they faxed their ACOG flow sheet at some point late in the pregnancy to labor and delivery.

In summary, the pre-implementation OB ambulatory world can be seen as an era when the OB providers were happy with the documentation (or charting) technology they had (i.e., the ACOG flow sheets). At that time, however, the CMIO along with the OCT team had started to feel that due to several factors (e.g., healthcare IT advancements, federal government mandates, institutional healthcare IT development

plans, etc.) there was a major need to computerize the clinical documentation workflows across all the university health system clinics, including the OB clinics.

4.4.2. Episode Two – The First Implementation Effort

As may be clear from what is portrayed in the previous episode, the OB clinical workflow had its own flaws. For instance, A4, who is an OB physician, mentions this:

> You know, the problem with that was, it was a paper chart. So, if you're on labor and delivery and the paper chart was at [a clinic] you did not have any access to that information.

Problems such as the one stated above by A4 along with some other concerns mainly brought up by the university health system's IS department led to the idea of defining and launching the AEHR project. This is how A5, the OCT's director, explains it: "One, we felt it was better for patient safety [mainly due to the concerns related to having ubiquitous access to patients' records] including OB. And two, the timing of that was because of meaningful use [referring to the federal government mandates related to the meaningful use of healthcare IT across all medical institutions in the country]."

In terms of technical design and configuration, OCT followed a certain approach during the whole AEHR project in general and "Phase 2" in particular. According to the AEHR "Phase 2" Expectations Agreement document, which was co-signed by the OCT's director and the OB clinic medical director, the medical director agreed to a discipline-specific customization plan for PowerNote or Clinical Notes (which was inside the iView) for physicians' use along with iView customization for nursing documentation. So, as A17, a nurse informaticist, says: "the rule of thumb was we're [referring to the OCT team] gonna treat them [OB] [just as] we treat everybody else." A12, the

applications analyst, adds: "it was supposed to work in the same way that we designed it for everybody else." And, A21, another nurse informaticist, explains it in this way:

> Pretty much everybody else was fairly consistent in their needs, our basic iView bands structure, some customization depending on what they did in that clinic, and then notes for the providers, custom notes for the providers, and we had the ambulatory QuickView page.

What A21 in the above quote refers to as the ambulatory QuickView page was actually a general summary or dashboard page that was not supposed to be discipline specific at the time.

However, OB physicians seemed to have different expectations from the system. A4, an OB physician, says:

> My expectation, my hope was that the system would duplicate all the, in electronic form, this paper work.... In a perfect world, the document would be this [pointing to the ACOG flow sheets], and I move the cursor to here and say typing that word and I move it to this cell and typing that.

A1, the OB/GYN department chair, says:

> What we would really like is something that looked like a paper prenatal chart, not because paper is better, but because a huge amount of thought went into that organization and that flow.

From the design and configuration perspective, therefore, what the OB physicians were asking for was a single place where they could enter and view OB-relevant data in a succinct way. A big design implication of OB physicians' expectations, then, would have been this: a customized QuickView page which could display all and only the OB-relevant data in a longitudinal manner for each patient.

Another way that OB physicians' expectations were challenging the default implementation/configuration plan was related to the segregation that the OCT team had in mind. A17, a nurse informaticist, puts that segregation into words like this: "Our

physicians informaticists associated iView with a nursing tool and they did not think that was the right tool for physicians to use. There was a state of mind attached to using iView." A17 also believes that the CMIO (A11) "associated a very big stigma that iView is a nursing tool." However, OB physicians, because of the type of succinct and checklist-type data entry they were used to in the ACOG flow sheets, needed to have a form of data entry other than the regular clinical notes that other clinics were using. Therefore, the only possibility for OB physicians was to use the iView tool. A21, a nurse informaticist, in retrospect, explains it like this:

> Using iView for providers to enter data was another huge change because traditionally they don't use that tool but in order to get the data in the way we needed it to go in, in a quick fashion, that was the best mechanism.

A12, the applications analyst, in a comparative theme, says:

> Other clinics, we were just automating this documentation piece [referring to the iView] pretty much for the nursing staff and the people that take your blood pressure and the stuff.

All these inconsistencies between the OB physicians' and the OCT team's mindsets with respect to understandings of and expectations from the first version of the OB-AEHR tool led the OB physicians to be hesitant about the effectiveness and success of the OB AEHR "Phase 2" project. A1, the OB/GYN department chair, expresses that hesitancy as follows:

> Challenge of the system [referring to the first-version OB-AEHR tool] was to come up with something that wasn't slower.... It was gonna be a big challenge to come up with a electronic system particularly within the constraints of Cerner that would be as effective.

The technical design and configuration was not the only problematic aspect during the first implementation effort. Another aspect was related to how the OCT team

conducted the project in terms of different types of resources, including time, budget and human resources. In terms of time, the OCT team had a major constraint due to the federal government's healthcare IT meaningful use mandates and timeline. A17, a nurse informaticist, describes the time pressure during the first implementation round like this:

> We were time-boxed into only having X amount of weeks to dedicate to OB. And, we were only, you know, given the guidelines from the project management office, we were only allowed to work on that solution for this amount of time, we were not allowed to give them an OB QuickView, we couldn't do anything special more than what we gave any other clinic.

The time pressure seemed to have a major impact on how OB providers encountered the new system and received training on using that system. In this regard, A18, who is an OB clinic nurse, says: "Until you actually put into practice, I don't think you knew what you needed and what you really wanted if you're not familiar with how the system works, especially if you're not computer savvy." In the same line, A4, an OB physician, adds:

> The other thing that went terribly wrong in the first round is what was like 'OK! The EMR is starting tomorrow, good luck.' And that was it. And I'm like no, no, no! You can't, because it slowed down our ability to actually take care of patients, so the office was a disaster because we were running behind, because patients were upset, nurses were upset ... nobody was happy.

So, although the original timeline for the implementation, as A2, one of the OB physicians acting as liaison during the first implementation round, describes, was supposed to be a month-long roll-out, the OCT team cut that roll-out from four weeks to two "and just sort of [threw] everybody in." A2 states:

> They eliminated those first two weeks where you would just do one or just do two, and just cut everybody['s] schedule by not enough for two whole weeks and had everybody documenting electronically for two whole weeks

and then they left. What that wound up doing, the reason I call it disastrous was people didn't really have the chance to get familiar with the system before they, "Oh, my god! I had to use it!" ... There wasn't even the opportunity to become conversant. It was still something out there. We couldn't play with it.

The other OB physician, who was liaison in the first implementation round, A3, also believes the OCT team did not follow his advice on having a prototype of the system first and letting people use it for a while. A3 says:

> The IT folks, they didn't change their approach real significantly to us. And I had advised, made a few recommendations which they didn't listen to.... My advice was to have a draft, let people use it for a while and amend it. And that way, when the clinic thought if they were behind, there could be a transition where they could do a few patients here or there, find out what works, what didn't, and then you would probably have gotten the people [who] were the biggest naysayers to have tried it a few times over a few weeks and say: here are some things to improve.

Time, however, was not the only reason that the OCT team did not give what the OB providers wanted at the time. Other factors, such as lack of skillful human resources and budget, also played a role. A17, a nurse informaticist, puts these constraints into words:

> An M-page [or QuickView], first of all, they were new, so our own [applications] analyst had to get up with the learning curve. Out-of-the-box from Cerner, we could only use [this] Cerner, we didn't have the ability to customize any, make any custom. So, M-pages were new back then and [the amount] of time it took to customize a single little thing was took [an] enormous amount of time because it was new.

A11, the CMIO, also adds to this by saying:

> So that being able to make pages like that, custom QuickViews ... which is HTML and Java ... It's something that is, that has existed in Cerner for about 5 years. And Cerner can sometimes give you their own versions of those which are out of the box, or you can have someone on our team make one from scratch. Making them from scratch is a big deal.... It's very expensive.

On this basis, all the resource shortcomings made the OCT team focus only on two things: customizing the PowerNote tool and its templates for OB physicians and the iView tool for the OB nurses, while having no plan to design customized QuickView pages for any medical department. And that is why, A1, the OB/GYN department chair, looks at the first implementation effort like this:

> The problem was, I think all these issues were raised, the problem was, you know, they were rolling it up clinic by clinic, and they really weren't doing any special kind of charting for OB. I mean there was really no effort to emulate the prior prenatal record.... I think there was, you know, that point that commitment from IT in the hospital was, you know, let's just get [them] up using the same tools and same resources that we do for every other clinic that we've rolled out.

The third and final aspect is related to how some OB physicians got involved as liaisons or champions in the first implementation round, and how that involvement affected the project's trajectory. A6, the project manager, mentions that during the first implementation effort there was a presumption that clinics' medical directors would be the best contact persons to start with for all the ambulatory Cerner implementations. That is why the OCT team contacted A2, who was the OB clinic medical director at the time. A2, in this regard, says:

> A year before they did any of the roll-outs, they were talking to the medical directors about "this is coming." And they were asking us to identify people within our departments who could be champions. And, I talked to A3 [um] because he was young and he was good with computers and I thought why not have somebody young and good. And he'd just finished his residency. So, he knew what they were doing in labor and delivery. He was familiar with all that stuff. Why don't you be the champion? But I also felt that as the medical director I needed to be involved. This was a massive thing. This was going to dramatically change my office. [um] So, I wanted to be involved. And so, that's how I got involved.

So, eventually, two physicians (A2 and A3) became involved as the liaisons in the first implementation round. But this was not the whole story. Getting physicians to work

as liaisons or champions is generally a tough thing to do, and OB physicians were no exception. A11, the CMIO, describes the situation thus:

> I think basically when we would come at these clinics and say: Hey! We need someone to help be a champion. It's hard to get doctors to do that. So, if you ever have a doctor who says: Yeah! I like to help. It's almost a slam dunk! So, I don't know for sure but I'm betting he [referring to A2] said: I'd be happy to be a part of that. And then by default he is the guy!

In this sense, it is not hard to tell that there was not much enthusiasm among OB physicians at the time to serve as liaison. For example, A4, who was not involved in the first round but became involved in the second round, says:

> There were already 2 folks [referring to A2 and A3] who had a personal interest in "IT stuff" and my plate was so full with other duties, I didn't really consider it a priority at the time (until after the first-round disaster). Truthfully, it felt like it should be more of a chore for some of the junior faculty I confess (just my own opinion).

But the lack of enthusiasm among OB physicians was not just limited to becoming a volunteer and serving as liaison. As the two liaisons (A2 and A3) explain, during the design and implementation time, it had been very difficult to get people excited about the project. A3 describes it like this:

> In the early phase, they tasked me with being sort of the shepherd of the effort from the IT department, which was tough cause I was the new faculty and it was harder to get as much attention.... Nobody wanted to talk about EMR and they didn't, you know, people didn't really like it that much.... It was a pain in the ass, honestly, you know, you talk to people about stuff they're not interested in.... The IT people wanted me to sell it and I was unwilling to sell something that they [referring to the OB physicians] didn't [like].

Despite all the aforementioned problems and issues, the OB AEHR "Phase 2" project yielded a system, which went live on July 13, 2011.

4.4.3. Episode Three – The Six-Week Use

After the system went live on July 13, 2011, OB physicians and nurses started to use it. However, they reported some major problems in their use of the system. Problems and issues were mostly raised by OB physicians. A4, an OB physician who then became the project lead in the second implementation round, says: "I think when, I'm a very heavy OB person, I mean I do a lot of obstetrics, so when I was given this tool to use and it was, there were too many flaws in it." Talking about one example of those flaws, A18, an OB clinic nurse, mentions that physicians needed to see all the information that nurses had already put into the system before they could write their assessment (or note) for a patient, and all that information and the lab results were not in a single place. This problem actually goes back to the fact that at that time the data viewing tool (i.e., the general ambulatory QuickView page) sometimes could not show all the information and lab results that were critical for an OB patient but not especially important for other types of patients. In this regard, A4 adds:

> It made it much more [um] tedious to put information in, and much more difficult to find and kind of like process and clinically assess that information once it was in there.... It was very hard to follow. It was hard to know if labs have been done or not done.... It also wasn't built in a very user friendly intuitive way. Like, I remember the point that I called A1 was when I missed ordering a test on a patient or offering it. And there was no sequel of it, but I was like I have no idea if these tests have been done, if they haven't been done.

The central problem, however, seemed to be something beyond just missing lab results. OB physicians were used to the ACOG flow sheets which had provided a completely different structure and organization of information than the one provided by the Cerner system. According to A8, another OB physician, that structural difference was making OB physicians to "look at too many places and there were too many

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different ways that [they] could [do the same thing]." A1, the department chair, explains

the issue very well:

> Thing that made us realize we had huge problems was when we realized it
> was not only difficult to get the new patients into the system but, you
> know, … the different structure, lack of reminders was making us
> potentially miss things at the return visit.… It was very unwieldy to get, so
> the first visit is a very comprehensive visit. You know, full history, full
> physical exam, review of prior pregnancies. That was cumbersome and
> unwieldy. And then for certain things that people need, remember
> prenatal care is very structured, you know, certain things, as long as the
> pregnancy is going normally, certain things happen at certain points with
> risks if you forget to do them. And for certain things … was hard to see
> whether that had been done previously or not.… We were losing the
> structure with what was in the initial implementation of Cerner.

So, as A8 points out, the biggest problem was that it was really hard to get a big

picture of a patient, the thing OB physicians were used to getting from the ACOG flow

sheets very easily.

All these problems, finally, led to a conception of a patient safety issue among the

OB physicians. A4 explains it thus:

> It was, in my opinion, it was dangerous because it was more obstructive to
> patient care than facilitate the patient care. I'm like an EMR should help
> make things better and more transparent, it wasn't doing that.

The widespread conception of a patient safety issue among the OB physicians then

led to an executive decision by the OB/GYN department chair. A2, who was the liaison

physician in the first implementation round, remembers it in this way: "Once they

invoked [patient] safety, A1 [put the] stop [on] it and said: 'This is a [patient] safety

issue, we must revisit it.' And so, at that point we revisited." A4, however, gives a more

complete picture:

> When it went live I started using it and was running into so many
> problems that I spoke to A1 and said, begged him to stop it. So, his email

was a response to the fact that clinically when it went into actually use it was not the tool we needed it to be.

Therefore, as is clear in the above quote from A4, A1, as the department chair, sent out an email to stop the use of the system. The email was sent out on August 24, 2011, and it terminated the six-week use period. An excerpt from the email is given below:

> As per our discussions earlier this morning, please temporarily suspend use of the Cerner prenatal charting for obstetrical patients pending completion of revisions and updates by IS. This should go into place as soon as you can communicate to your staff the necessary information and have the required paper charting materials available.... All new OB patients should be charted on our standard paper charts. As we discussed, OB patients who have had their initial charting on the prenatal EMR since its roll-out 6 weeks ago should be handled similarly to how we handle charting on outside transfers.
>
> We remain committed to having an effective EMR for OB, and placing it in use as soon as possible. We will be working with IS to ensure that the revised version meets all of our needs and optimally integrates with clinic workflow. This is a department priority, and I ask that you please free up division members and support staff as necessary to participate in meetings to finalize specifications for the revisions, to test the revised software, and for necessary in-services regarding the revisions prior to the roll-out.

As is obvious from this text, the OB clinical workflow went back to the previous state, which was based on using the ACOG flow sheets.

There is a range of different perspectives among the case study participants on the nature of the reaction from OB providers to the first-round implementation effort. In fact, one big question is whether we should simply call that reaction "resistance to IT implementation" or should use a different term (or way of conceptualization) to describe the way in which OB providers reacted. Another big question, on the other hand, is related to the idea that whether or not such a reaction (or "resistance," as some people might call it) is something "bad" and destructive. In the following paragraphs and

quotations, that range of different perspectives is presented, starting from more classic perspectives on resistance and change and, then, going towards more progressive perspectives on how the OB providers reacted to the first-round implementation.

A13, who is an OB physician, brings a more classic perspective while believing that "resistance" is not necessarily a bad thing. A13 says:

> There was resistance because nobody likes doing anything new. We are creatures of habit. We like doing things the way we used to it.… This resistance doesn't have a bad connotation.… It's OK to have resistance. The key is help facilitate the transition. Don't expect to not have resistance. That's a false expectation.

A8, another OB physician, believes that that reaction could be called "justified resistance." A8 says: "It was like something that, we're trying to, because some of us, like I am, like: All right! Fine! Let's just try it make it work. But it just didn't work. So, it's kind of like justified resistance."

A17, a nurse informaticist who was highly involved in the project, adds to both A13's and A8's perspectives by somehow acknowledging a constructive aspect to the OB providers' reaction. A17 says:

> Their resistance was not a bad thing.… I don't think that they did a bad thing and I think that they did what they needed to do to feel safe to deliver safe patient care. And, so, that message was [heard] loud and clear that we have to go back.

A18, an OB clinic nurse, even goes one step farther and says:

> I don't think it was resistance. I think it was a system that wasn't as effective as it could be. I mean I think resistance played into it, you know, when you, they don't want to change and they don't [want to learn] this, but I think had it been smoother, had it worked a little more seamlessly, you may not has got as much [um] people not [want] to work with the system.

A11, the CMIO, adds a reason for not calling the OB providers' reaction "resistance." A11 believes that the fact that OB people became highly engaged and active in the second implementation round proves that they were not resistant in the first round. A11 says:

> The reason I don't think they resisted is because they became super active and involved in the design of the next system. So, if you were resistant, you would say: "Look, this technology is crap. I've already tried that once. Get out of my office! I don't have time for this." But instead, I think they either knew that we're gonna have to make this conversion or also saw that there was value if that could be done correctly.... It wasn't the traditional complaint that this is slowing me down. It was: I feel like I'm missing stuff, I'm not seeing the whole picture.... Kudos to them!

Talking in line with A18 and A11, A1, the department chair, also believes that that reaction was not "resistance." Instead of "resistance," A1 refers to the concept of "appropriate feedback." A1 says:

> People didn't resist, I mean, people did the best they could with it. The difference for OB was it wasn't working in a way that was safe and effective, and that was not so much resistance as recognition of our real problem that when we sat down with IT administration and walked through step by step what our concerns were, there was complete agreement that there was a problem and it needed to be transfigured. So, I don't think there was resistance. I think there was appropriate feedback.

A4, an OB physician, takes another step forward and stops calling the OB providers' reaction "resistance" from the beginning. A4 actually uses another term to describe it: trust. A4 says:

> I think I didn't TRUST that this was going to be a product focused on helping the clinician. I doubted its credibility ... and thus ... had little faith it was going to be something I would embrace. Perhaps because I didn't believe that the physician[s'] interest was at the core of the project ... rather ... the race to get on an EMR to check another box off the government check list. Within one or two patients where I was trying to use it ... my fears were confirmed (the "first impression" concept). Then I had lost all faith in the effort.

A9, a physician informaticist, finally, provides the most proactive perspective on the issue. A9, basically, divides the whole concept of "resistance" into two separate types: "ideal (or active) resistance" and "passive resistance." A9 then points out that the OB providers had displayed "ideal resistance." A9 says:

> This is sort of the ideal resistance. What is destructive is the passive resistance that I think is more prevalent, which is: "This is terrible, this whole system is awful. I'm just gonna use it this way because it gets me through the day but it's not a good way to use the system."... I think that this resistance [referring to the OB people's reactions] was: "Yeah, we tried it, it failed, it didn't work, we're not gonna use this, sorry." That's perfect. Then it gives us a chance to come back around and build it right.

4.4.4. Episode Four – The Second Implementation Effort

According to A4, this was an important project for the OB/GYN department. A4 says: "This was a touchy issue. I mean half of our business is OB so it needed to be an efficient tool." So, although there was some resistance from the OCT team side, as A11, the CMIO, mentions: "I knew this was the right thing to do but I also was irritated in how expensive and how much of a diversion it was." But things changed quickly after the email sent out by A1, the department chair, on August 24, 2011.

From the perspective of research participants, one of the most important things that happened at the beginning of the second implementation round was a major change in both the role of liaison physicians and the individuals playing that role. A4, as one of the OB physicians with a heavy OB practice load, became one of the key liaisons. Moreover, instead of being only an ordinary member of the project's team similar to the case in the first implementation round, A4 became the project lead in the second implementation round. A4 puts it into words like this:

> After we stopped it and I started to explaining to colleagues [that] we have to stop it because of all these problems with it, I would hear comments like

"Yeah we brought that up, we brought that up." Well! Guess what? I [would be going to] bring it up louder, stronger and harder...

This kind of change in the level of physicians' involvement/engagement in the second round seemed very effective and productive to the OCT team. A5, the OCT's director, in this regard, says:

> ... The other word is engagement. You have to have engagement. That doesn't mean listening, that doesn't mean anything else. It means engagement. I [referring to a hypothetical user] own this. She [referring to A4] owned it. She took it, she owned it, it was hers, she built it, she presented it to OB. When we [referring to the OCT team] presented, we had to teach, but ... she got up and presented it, and then we got up and taught.

So, in this sense, A4, mostly along with another physician, A8, spearheaded the revision campaign. At the time, as A4 mentions, they knew that if it would be in their hands, although it was going to be a lot of time and effort and energy, they could, with the IT people, build a product that could translate what the clinicians needed into what the IT people could do. A4 says:

> I and A8 spent so much time and energy really championing a good product. We kind of felt like we have to believe it with every ounce of our body and we have to sell it. The IT people can't sell it.

On the other hand, according to the project manager, A6, the OCT team involved the physician and nurse informaticists at a much more detailed level during the second round. A17, a nurse informaticist, in this regard, says:

> We [had], you have to [paint a vision] for them because they can't quite see what has not yet been created. So, you have to create that vision that roadmap, and I think I was very influential in that, in helping them understand what this was, how this was gonna change their practice.

Most people think that the system changed a lot during the second roll-out. The biggest change, in fact, happened in terms of viewing OB patients' data. For that, a

customized OB QuickView page was designed. People like A17 (nurse informaticist) and A2 (OB physician) see that as "a tremendous amount of change." A4, as the project lead during the second round, gives a specific example of how the changed and customized QuickView page made the system more useful for OB providers. A4 says:

> We made it [um] a document where you could look at the screen and know a lot about the patient right away.... If I'm a patient ... and have high blood pressure that goes on my problem list. So, the problem list would populate the OB chart, but there are obstetrical problems that are really big problems but are not really a medical problem.... So, that was getting lost in translation.... We did it as we generated an OB issues list.... So we, internally, could monitor all the relevant obstetrical issues while not committing that to the patient's kind of master chart as true "problems" ... and that was very helpful cause we need to keep things obstetrically on our radar that become ultimately a non-issue either during the pregnancy or after the pregnancy.

Another difference between the first and second rounds of implementation seemed to be in terms of time and workload scheduling in making the system go live. In regard to this, A4 says:

> We weren't just gonna say: "OK! Tomorrow is the day that everybody goes live with this." We were gonna say: "Listen if you're greater than, your patient is greater than 34 weeks stay on paper." So, people love that if it's 30 and up [they've gotta get] stay on paper. If they were less than 12 weeks, we started exclusively on the EMR. If they were somewhere in between, we do both.

The second version system eventually went live on September 18, 2012.

4.4.5. Episode Five – The Current Use

Although, after the second go-live, the system underwent a few other changes and revisions, the system currently being used by OB providers can still be considered very similar to the system that went live on September 18, 2012. One big question now is whether the current version of the system is good or only adequate. Different people

have different thoughts about this. The OCT team and the CMIO, for the most part, think that they have delivered a very good system. A11, the CMIO, says:

> [I] think it's very good.... If the docs still complain about [it] I would be so frustrated because we spent so much time and energy on it.... I have the sense, and I don't want to know the truth if it's not what I sense, that they very much like this system, especially compared to the first version.

A12, the applications analyst, also adds this to what the CMIO says:

> Very user friendly for the providers, very user friendly for the nurses ... This was a basic get it in [referring to the first version], this was a deluxe [referring to the second version].

However, on the users' side, things are more complicated. A4, the OB physician who had been highly involved in the second-round roll-out, defends the system by saying:

> Now if you ask everybody, no one would ever go back to paper, ever.... Because in any given moment I can pull up any of these chart[s] instantaneously.... And, quite frankly, I think we built something that was pretty good.

But for some other OB physicians and nurses, the system is still not at that desirable level of usability. A18, an OB clinic nurse, believes that the system is more than adequate because she can find information, but she is still always learning something different because sometimes there is more than one way to do something. A2, an OB physician, also reports some other problems with the system. A2, for example, has not yet figured out a way to write clinical notes as efficiently as used to be done on paper. A2 also talks about the customized QuickView page and the attempt to make that page as similar as possible to the ACOG flow sheets. A2 says:

> This is the best they could do to give us our flow sheet. And it's, it is a flow sheet. But I can't print it off and send that with my patient when she takes a flight to Colorado in case she gets in trouble in Colorado, which is what

we forever did with the ACOG.... I'm sure they'll say: "Well, we can print off the medical record," but you can't do it as compactly, as succinctly as we used to be able to do with the [ACOG].

A1, the OB/GYN department chair, also believes that the system is only adequate and that it is not as efficient, quick and effective or as well-organized as the ACOG flow sheets. A3, another OB physician, describes the issue this way: "Cerner is a cumbersome product. It's not an intuitive design." And A13, another OB physician, in a rather strong and bold statement challenges the basic configuration of the system and the fact that there are two separate places to enter and view data:

> I dislike the idea strongly that iView and QuickView are separate. OK? You should be able to edit the information you're looking at. You shouldn't have to go to a separate screen. This is an IT construct of no value to a clinician. ... I have to go to iView, put in all the values in iView, confirm correct, then go to QuickView, update my screen, and then see the correct results. That makes no sense to me. Whoever's designing this on [the] IT side, they are an idiot [high pitch]. OK? I understand there might be good reasons in the background to do it the way we did it, but I'm not an IT guru, I don't care about those reasons. I'm a user. I care about my reasons.... It should just be QuickView.

The future of this system at the OB/GYN department is yet another aspect of the current use of the system. In this regard, A13, an OB physician, believes that they have customized the Cerner a great deal, and that this is both a blessing and a curse because they made it more useful for themselves but also made it impossible to take advantage of any upgrades because of incompatibilities. Therefore, A13 anticipates that they will be stuck with this system forever. This aligns with what A21, a nurse informaticist, says:

> We have done a lot of customization, which it's great for our users 'cause we tried to mold the system to just what they need, but it's bad for us because it becomes a maintenance thing.

OB providers, however, are not only critical about the system instance they are using, they are also not very positive about the function and role of EMR/EHR systems in general. For instance, A13, an OB physician, believes that EMRs are great on the in-patient side, where the primary requirement is comprehensiveness, but they do not understand the need for speed on the out-patient side, for they are not built that way. A2, another OB physician, mentions that most of the EMRs are built to satisfy insurance companies, so doctors and hospitals can bill as high as they want to bill. Finally, A13 adds this:

> Somebody somewhere in a tower is getting paid a lot of money and they think they did something useful, and all they did is they made it more challenging for the rest of us to find workarounds that make it work.... We just wanna get our work done in a simple and efficient way and all these obstacles keep coming up.

4.4.6. In Retrospect – Participants' Lessons Learned

Many of the participants' lessons learned pertain to the first implementation effort and the reasons it was not successful. From the OCT team's standpoint, one major lesson learned is related to the fact that the technology they delivered to OB providers matched very poorly the way the providers practiced clinically. According to what A11, the CMIO, says, the medical informatics team usually want the computerized system not to be a replication of what used to be on paper; but in this case and in retrospect, it turned out that the OB physicians were right. In fact, it was not unrealistic and unfair to insist that they could not do their work if the system did not replicate the ACOG paper format. A11 also believes that for a clinic like OB, in which both nurses and doctors make data entry into the system on the iView page, they should have had design meetings with

the participation of both nurses and doctors at the same time rather than holding separate meetings for them.

On the other side, the OCT team leadership also believes that another major aspect of the problem could be attributed to what A6, the project manager, calls the "influencer identification process" in the first implementation round. A6 says: "One of the things that we've learned is to be able to have more due diligence in the influencer identification process." What A6 means by "influencer" becomes clearer by looking at what A5, the OCT's director, says in this regard:

> We put people at the table that we thought we're developing what the providers wanted to use and needed and would meet the needs of the providers. In retrospect, I believe that we had the wrong people at the table…. And then realized that we made something that the influencers didn't feel with safe and if it's not safe, you can't use it.

Therefore, the OCT team leadership mostly believes that the champions or liaisons from the OB/GYN department's side (mostly A2 and A3 as OB physicians) were not the right representatives for their department and did not possess enough influence in their department.

But things look somewhat different from the OB physicians' perspective. A4, who intentionally did not become involved in the first implementation round but then became the lead liaison in the second round, believes that the problem lay more in the fact that the OB physicians and their needs were not at a high priority level for the OCT team to make the system adequately usable for them and the liaisons were also not able to convince the OCT team to do so. A4 says:

> So I think the folks who were involved in the project up till this point [referring to the first round] were very well intended but not aggressive enough about [um] getting the tools in place that would help the provider. … I think the people on the clinical side weren't vocal and perhaps

emphatic enough about what we needed. So, as there were, my sense is that, as there were these dialogues of what the tool, Cerner, could do and what we needed, it was always defaulting to what Cerner could do, and we, we didn't champion our needs well enough.

Another major aspect of participants' lessons learned pertains to a cost-benefit scheme that could be applied to assess a different scenario that might have happened. The other scenario, in fact, would have been to purchase and implement an out-of-the-box solution provided by Cerner™ called PowerChart® Maternity instead of customizing the PowerChart® tool in-house to work as an OB ambulatory solution. As A21, a nurse informaticist, describes the situation, the tool had been on the roadmap for a long time; but because it was so expensive for the university health system to buy and implement it, it was always going up and down on the priority list, and it just never got there.

While some participants believe that PowerChart® Maternity is not much better than what the OB providers currently have, some other participants think that PowerChart® Maternity could deliver many more functionalities, and that it also would have been less expensive for the university health system simply to buy and implement the out-of-the-box solution instead of developing something from scratch in-house over a two-year period. In this regard, A21, a nurse informaticist, says:

> When you look back over all the time and money we spent on this, it's like we should've just bought the tool [referring to PowerChart® Maternity].... If your EMR vendor has a tool that is built to meet the need[s] of that group, implement the tool, because they wouldn't have built it if it was just something that was very simple to do.... Cerner put their dollars behind building that, then why should we try to reinvent the wheel?

4.5. Summary of the Case Story

The pre-implementation OB ambulatory world can be seen as an era where the OB providers were happy with the documentation (or charting) technology they had (i.e., the ACOG flow sheets). At that time, however, the CMIO along with the OCT team had started to feel that due to several factors (e.g., healthcare IT advancements, federal government mandates, institutional healthcare IT development plans, etc.) there was a major need to computerize the clinical documentation workflows across all the university health system clinics, including the OB clinics.

In late 2010, the OB-AEHR-Phase-2 project started with a design/configuration episode where most OB providers were not thinking that the project was especially important or necessary, or even still had a hope that their medical department and clinic might be excluded from the ambulatory EHR implementation project. In other words, the project started in an atmosphere where there was a big gap, specifically between the IT people's and the OB providers' mindsets about the project and its necessity; and the interactions happening during the episode did not help to narrow that gap. With the OB providers remaining mostly apathetic about the project, the first version of the OB-AEHR tool went live on July 13, 2011.

After the go-live date on July 13, 2011, the OB providers started, in a more or less transitional mode, to use the OB-AEHR tool while they were still doing some parts of their job using the ACOG flow sheets. During this time, having a direct exposure to the OB-AEHR tool, the OB providers mostly came out of their apathetic mode and started to raise issues and concerns about the OB-AEHR tool and its effect on their clinical practice. In this sense, the mindset gap, which initially had emerged in the phase 1,

became wider and led to the suspension of the use of the OB-AEHR tool through an email sent by the OB/GYN department chair.

Although the OB providers went back to using their own ACOG flow sheets, they had already begun to realize the importance of the project for the institution and also the advantages that a well-designed OB-AEHR tool could have for their own clinical care. This was a moment when, for the first time during the project, the mindset gap mentioned above started to shrink. This shrinkage in the mindset gap led to another round of design/configuration getting started almost immediately after the suspension of the first-version OB-AEHR tool.

The deep and prolonged interactions during the second design/configuration round narrowed the mindset gap even further and led to a second go-live of the system on September 18, 2012. With a much more organized transition episode compared to the one in the first roll-out, the second roll-out expanded the common ground between the OB providers and the IT people; and this led to the second-version OB-AEHR tool becoming the only documentation technology in use for day-to-day clinical care in the OB clinics.

5 EMERGENT INTERPRETIVE AND EXPLANATORY/PREDICTIVE SCHEMAS

5.1. Introduction

The purpose of this chapter is twofold. On the one hand, it attempts to give an "interpretive understanding" of the OB-AEHR-Phase-2 (OBAP2) project's case, which was elaborated in terms of "subjective understanding" in the previous chapter. The "interpretive understanding," as Lee (1991) describes it, is a level of understanding that belongs to the observing organizational researcher. By presenting a body of emergent interpretive understandings; therefore, I, as the researcher in this current research, strive to make the OBAP2 project's case meaningful for myself through interpreting, judging and analyzing the actions/reactions, meanings and events that the actors involved in the OBAP2 project consider as part of their own common-sense, day-to-day life experience in their workplace.

On the other hand, and informed by the emergent "interpretive understanding" mentioned above, a case-independent explanatory/predictive account (i.e., "positivist understanding," as Lee [1991] terms it) on people's reaction to IT implementation will also be presented. By presenting the explanatory/predictive account, this chapter, in fact, strives both to explain, in a cause-and-effect yet recursive manner, people's reaction to IT implementation phenomenon, and to provide a guide in order to anticipate the trajectory of IT implementation processes.

The remainder of this chapter proceeds as follows. The next section will describe multiple analytical standpoints and their respective interpretive schemas, which emerged during and after conducting the OBAP2 project's case study. The third section, then, will go over three different emergent versions of a proposed explanatory/predictive schema.

5.2. The Emergent Interpretive Schemas

The purpose of this section is to achieve an understanding (and also a judgment) of the case study documentary evidence and also of how different actors saw themselves and others and how they lived and behaved during the OBAP2 project. The aforementioned kind of understanding is composed of multiple analytical standpoints, which will be discussed hereunder.

5.2.1. Documentation Workflow/Tools

From the OB documentation workflow and tools standpoint, a person who is adequately familiar with the OBAP2 case can discern an evolutionary path which starts from the ACOG flow sheets as the primary documentation tool in the pre-OBAP2 era and ends up with the stage where the OB-specific tools inside the Cerner™ PowerChart® came into existence. The whole evolutionary path of the documentation tools and how they were/are linked to each other is portrayed in Figure 9. From the case study data, one can see fairly clearly that the ACOG flow sheets were playing the most important role in structuring the way in which the OB providers were apprehending their clinical workflows in the pre-OBAP2 world. In fact, OB providers were using the ACOG flow sheets as the only tool for entering and viewing patients' data. In this sense, during the pre-OBAP2 lifetime, the ACOG paper sheets were the most crucial technical

artifact in the socio-technical world of the OB department's clinical care, even though the OB providers had some experience with using another technical artifact, i.e., the Cerner™ PowerChart®. The Cerner™ PowerChart®, at that time, was indeed only being used, mostly by clerks and nurses, to place lab orders, retrieve lab and diagnostic results and view in-patient charts.

The ACOG flow sheets had two very important advantages for the OB providers. First, they were providing a single place for entering and viewing data. Second, since the nature of the OB clinical care is longitudinal rather than cross-sectional, the ACOG flow sheets were serving as a dashboard tool to view the longitudinal developments in the patients' medical status. Consequently, in the OB clinical setting, where, as in any other clinical setting, workflow speed is much more important than comprehensiveness, both these features were significantly contributing to the OB clinical care being conducted as rapidly and smoothly as possible. During the interviews, one non-OB physician even acknowledged that these features of the ACOG flow sheets can form the basis of a successful EMR tool. That person (A9, a physician informaticist) said:

> They [the OB people] were a group that was already in the mindset that you do your work from a summary…. And this summary sheet is the key to all of EMR success. That's the way electronic medical records are supposed to be used…. That ACOG sheet was really the EMR, just on a piece of paper.
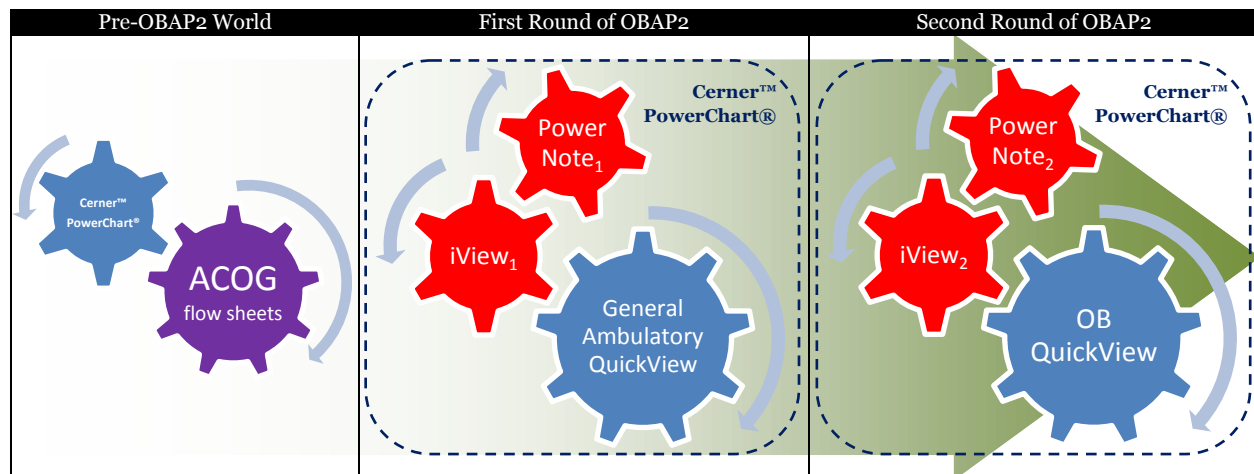
Figure 9: The Evolution of the OB Documentation Tools
(Blue: Data View, Red: Data Input, Purple: Both)

The outstanding role of the ACOG sheets in the socio-technical and cultural world of the OB clinical care was the major reason why the introduction of the OBAP2 project and later evolutions of the OB documentation tools (as they are depicted in Figure 9), in fact, did not make any significant change to the ACOG-based worldview of the OB providers (mostly OB physicians). This kind of worldview, instead, made the OB providers insist (to some extents during the first roll-out, but much more strongly during the second roll-out) on having a computer tool that could replicate all the functionalities and advantages of the ACOG papers.

However, on the other side, the very structured and longitudinal nature of OB clinical practice was largely overlooked by the OCT team during the first implementation round. The OCT team also underestimated the important role that the ACOG sheets were playing in making the workflow of the OB clinic efficient and effective. This is indeed reflected in OCT team's having the default Cerner™ PowerChart® configuration (i.e., customized iView for nurses, customized PowerNote templates for physicians, and the general ambulatory QuickView page for everybody

across all clinics) in mind when they approached the OB clinic during the first implementation round. Nevertheless, although the OCT team, at that time, knew that the workflow nature at the OB clinic was different from that of most of the other clinics, for certain reasons (time, budget, etc.), they chose not to treat the OB clinic differently. In other words, one could say that the OCT team simply underestimated the importance of that workflow difference and its impact on the OBAP2 project's fate. Not treating the OB clinic differently, the OCT team then encountered a very serious consequence, which was the suspension of the use of the system ordered by the OB/GYN department chair. From the perspective of the OB providers (mostly, the OB physicians), the first version of the system had a big problem, namely, the lack of an OB-specific QuickView page that could display all the OB-relevant patient data in one single summary page and in a longitudinal manner. By raising this problem, the OB providers, in fact, were manifesting their ACOG-based worldview. According to that worldview, any computer tool that was intended to replace the ACOG papers should have been able to give the OB-relevant summary data for a patient over the period of her pregnancy. Again, from the perspective of the OB providers, the OB-relevant data could not necessarily be found in the general ambulatory QuickView page that was available in the first version of the system because there are some symptoms, lab results and diagnoses that are non-issues for other types of patients, but can indeed be serious issues for obstetrical patients and that needed to be highlighted or flagged on the QuickView page.

The second implementation round, therefore, aimed at focusing on the specificities of OB clinical care, and the result was a system that included an OB-specific QuickView page. The second roll-out also included some changes in the other tools: iView and

PowerNote. Especially in terms of the iView tool, the second round of design and configuration was a response to the OB providers' challenging another aspect of the OCT team's default implementation mindset, namely, that the iView tool is meant to be used only by nurses. The nature of the OB clinical workflow, which was in line with the ACOG-based worldview, was based on the notion that OB physicians most of the time enter their assessments (or notes) not in a text-like clinical note, as other kinds of clinical physicians do, but in a checklist-type format. In this sense, it was not sufficient for the OB physicians to use only the PowerNote, which is a tool for writing clinical notes; they were also expecting to have a space (similar to what they had in the ACOG flow sheets) to include their itemized assessments (or notes). Therefore, the iView needed to be a data entry tool for both OB clinical nurses and doctors. Consequently, during the second implementation time, the iView tool was altered to address the OB physicians' data entry needs.

Despite all the second round changes mentioned above, the current version of the system is still not viewed as being as smooth and fast as it could be by most of the OB physicians. From the perspective of the OB providers, some major issues and challenges still remain, such as the existence of separated spaces for entering and viewing data (which again contradicts the ACOG-based worldview of the OB providers), the confusion over the existence of several ways to do the same thing, and a big dilemma related to the future of the OB-AEHR tool. This is called a dilemma because although the customizations happened during the second roll-out have made the system much more usable for the OB providers, they potentially have made the maintenance of the system

and its forward compatibility with any future upgrades/systems coming from the vendor (i.e., Cerner™) very challenging.

All the technical evolutions addressed above were in an interaction with some of the social evolutions that occurred throughout the OBAP2 project. In fact, all the changes for the OB-AEHR tool over the course of the 2-year OBAP2 project had an impact on and were manifestations of a larger dynamic world in which all the evolutions in people's *understandings, values and expectations* with respect to the social and technical aspects of their workplace environment as well as all the interactions among different stakeholder groups were constantly shaping the landscape of technology use in the OB clinical setting. So, one can reasonably argue that while part of the reasons for the aforementioned tool/workflow issues can be traced back to the magnitude of design flexibility that the Cerner™ PowerChart® tool was providing, some important social aspects also need to be considered.

5.2.2. Understandings, Values and Expectations

On the basis of the gathered interview data and documentary evidence from the case study, one can classify all the actors involved in the OBAP2 project into three general stakeholder groups (or types):

- IT implementers: CMIO, OCT team, and applications analyst;
- Informaticists: physician and nurse informaticists;
- OB providers: OB physicians and nurses.

One point worthy of mention here pertains to the stake and/or role the hospital's leadership had, particularly during the OBAP2 project. While not involved directly, the hospital's leadership had an impact on the trajectory of the project. In the first place, the

leadership strongly supported the whole idea of ambulatory EHR in general; hence they came very close to the position of IT implementers. Later on, however, when the OB/GYN department decided to stop using the OB-EHR tool after the first implementation round, the leadership (particularly, the Chief Medical Officer, as A11, the Chief Medical Information Officer, pointed out) became involved in supporting the OB/GYN department's decision and, hence, approached the position of the OB providers. On this basis, the hospital's leadership's role does not seem to fit into the classic notion of "chain of command." This is due in part to the special arrangement of affairs in healthcare organizations where providers (specially, physicians) cannot be simply deemed ordinary subordinates.

The case study data also shows that each stakeholder group had its own set of understandings, values and expectations with respect to both the social and the technical aspects of the OB-AEHR implementation occasion. The important and analysis-wise interesting fact, then, is the amount of "divergence" among all these different sets of understandings, values and expectations. The current research study, in fact, prefers to use the term "divergence" instead of or as opposed to "convergence." The reason lies in the nature of this current research study, the major aim of which is to *understand* and *explain* what exists as opposed to *prescribe* what should exist. On this basis, it is clear that the notion of "divergence" refers to what naturally, and by default, exists with respect to different sets of understandings, values and expectations held by different stakeholder groups, while the notion of "convergence," on the other hand, refers to what should/could be achieved by design.

The natural divergence among different stakeholder groups' understandings, values and expectations, therefore, can adequately explain the reason the three aforementioned stakeholder groups did not seem to share the same concerns, goals or pains at different points during the OBAP2 project. That the different stakeholder groups did not hold the same concerns, goals or pains should not be hastily interpreted as if one stakeholder group displayed "resistance," "apathy" or anything like that to the other stakeholder groups' concerns, goals or pains.

On the social side, it is very important to look at the actors' (as representatives of the stakeholder groups) divergent understandings, values and expectations regarding the issues related to social structure and, more specifically, those related to the perceptions of power and influence. For instance, during the time that the first round of implementation was starting, certain understandings that some senior OB physicians had, at the time, in regard to the social structure of the OB/GYN department led them to think that the OB-AEHR project was not so important as to be considered a priority for them to be involved in as a liaison (or champion). In this regard, A4, an OB physician who later became a champion in the second round of implementation, says:

> Truthfully, it felt like it should be more of a chore for some of the junior faculty I confess.

From the perspective of the OCT team, however, it was clear that the project was very important; and hence, the OCT team's intention, at the time, was to recruit the most powerful and influential individuals in the OB/GYN department to serve as liaisons. On the other hand, the default understanding of the social structure of medical departments among the OCT team members was based on the notion that clinics' medical directors are the most influential individuals. That was the reason why the OCT

team started to interact with the OB clinic medical director as liaison in the first round of OB-AEHR implementation. From the perspective of the OB providers, however, the OB clinic medical director was not exercising that much power and influence in the OB/GYN department. This divergence of understandings in regard to the social structure of the OB/GYN department, therefore, is why A5, the OCT team's director, in retrospect, says this:

> Thinking they [referring to the liaisons in the first round of implementation] were influencers, we didn't do it intentionally, [um] and didn't go to the influencers, but we should have. And, built what we thought was the right thing to do…. And then, realized that we made something that the influencers didn't feel with safe and if it's not safe you can't use it.

On the technical side, also, each of the stakeholder groups held a particular and different set of understandings, values and expectations with respect to the role/function/use of IT. In the OBAP2 project's case, the IT element can be, in fact, viewed in two ways: one, "EMRs/EHRs in general" and, two, "OB-AEHR in particular." Having IT as "EMRs/EHRs in general" in mind, one could clearly sense that the actors who were involved in the OBAP2 case had quite heterogeneous understandings, values and expectations of the role/function/use of EMRs/EHRs in healthcare settings. To fully acknowledge the aforementioned kind of heterogeneity, it is enough to look at, for example, how the actors from the two competing stakeholder groups in the OBAP2 project (i.e., the IT implementers and the OB providers) viewed the role/function/use of EMRs/EHRs. From the perspective of the IT implementers, ambulatory EHR was basically a natural and immensely useful expansion of in-patient EHR. However, from the perspective of the OB providers (especially, the OB physicians), EHRs/EMRs were largely understood as tools suitable for the in-patient side of medical care, since the

original intention and purpose for building most of them was to respond to the need for comprehensiveness in medical documentation, and such comprehensiveness is mostly needed to justify medical expenses when they are being submitted to insurance companies. On this basis, from the perspective of the OB providers, ambulatory EHR was not a natural expansion of in-patient EHR because the embedded attitude in the design of EHRs/EMRs generally supports the notion of comprehensiveness and not the idea of speed of medical documentation, which is greatly needed in ambulatory (or clinical) settings. On the other hand, again from the perspective of OB providers (at least, in the initial implementation round), the necessity and push to go towards ambulatory EHRs/EMRs (or even in-patient EHRs/EMRs) did not originate from patient safety or even medical workflow optimization concerns, but they mostly came from the federal government mandates, which do not tend to be understood by the physicians as necessarily in line with patient safety or other types of legitimate concerns.

Having IT as "OB-AEHR in particular" in mind, again, one can easily understand from the OBAP2 project's case that different types of actors possess completely divergent understandings, values and expectations of the role/function/use of the OB-AEHR tool (i.e., Cerner™ PowerChart®). For instance, during the first implementation round and from the perspective of IT implementers, if you were a doctor PowerNote was the tool for you, and if you were a nurse iView was the suitable tool for you to interact with. However, the OB physicians challenged that mindset. The OB physicians, on the basis of their ACOG-based worldview, also challenged the idea that it is sufficient to have a single general ambulatory QuickView page for all clinics. A very interesting example that highlights the divergence of values and expectations held by different

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stakeholder groups pertains to the current use of the OB-AEHR tool. In fact, while the OB providers are still complaining about the existence of too many options in the system and definitely need a much simpler and more intuitive interface design, this is how A21, a nurse informaticist, responds to users:

> I always tell our users: when in doubt, right click! Because there is gonna be something behind that data element or on that window…. So, if there is not something you're not seeing, right click and you're gonna get *a bunch [of] more choices.*

All the divergent understandings, values and expectations, however, can be seen as components of an overarching body of meaning that the actors involved in the OBAP2 project's case would have been collectively forming over time. Although not all parts of that body of meaning are commonly believed/shared by all actors, in most cases, actors have been aware of each other's understandings, values and expectations. For instance, even during the first implementation round, the OCT team was aware of the OB providers' expectation to have a documentation tool that could replicate all functionalities and advantages of the ACOG flow sheets, even though the OCT team did not believe in that notion at that time. On the other hand, the existence of the aforementioned kind of divergence does not mean that the actors in the OBAP2 project's case had nothing in common in terms of their understandings, values and/or expectations. For instance, the interview data shows that most of the participants, regardless of the role they were holding, believe in one big advantage of healthcare IT (and, so, of the OB-AEHR tool), which is its capability to make patient records ubiquitous.

Figure 10 can therefore be used as a summary visual presentation of the above discussions.
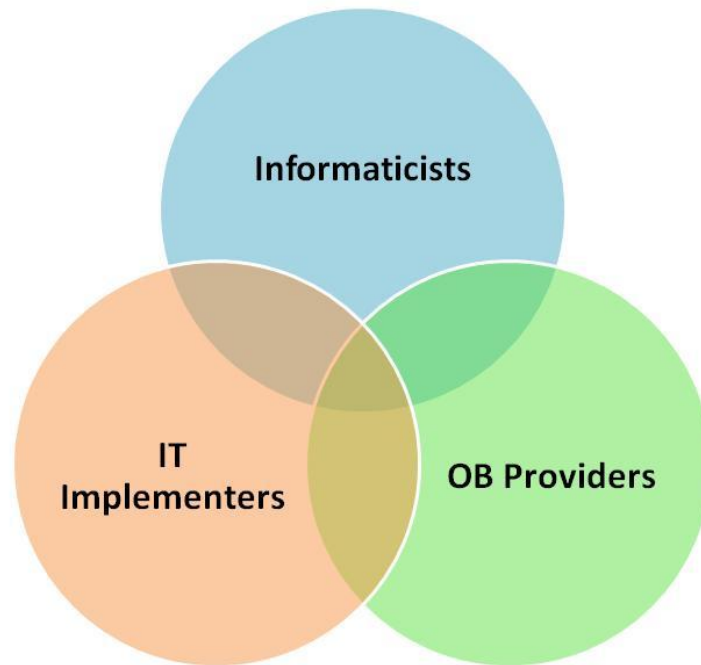
Figure 10: An Overarching Body of Meaning Composed of Three Partially Overlapping Yet Divergent Areas of Understandings, Values and Expectations Held by Different Stakeholder Groups

5.2.3. Interaction among Actors

As discussed in the previous part and also visible in Figure 10, there are two co-existing conflicting sides to the overarching body of meaning which different stakeholder groups would have been collectively forming over time: commonality and divergence. From the OBAP2 case study data, it can be understood that both of these conflicting sides can serve as interaction (or action) enablers. As an example that truly captures this perspective, we can look at the body of meaning that was formed over the six-week use time period. On one side, the divergence in understandings of and expectations from the OB-AEHR tool eventually led the OB providers' stopping use of the first-version system. On the other side, and shortly after that system's use suspension, the OB physicians, who had already raised most of the issues about the system and, at the same time, become aware of the importance of the project for the

OCT team and the whole university health system, started somehow to see the world with the eyes of the OCT team and to assume themselves to be part of the IT implementers' group. This kind of attitude, then, led to one of the OB physicians becoming the project's lead in the second roll-out and also to several OB providers interacting extensively with the OCT team to revise the system. In this regard, A4, the physician lead in the second round of implementation, says:

> I and A8 spent so much time and energy really championing a good product. We kind of felt like we have to believe it with every ounce of our body, and we have to sell it.

It can also be understood from the OBAP2 project's case that the emergence of interactions among the actors would, in turn, have significantly affected the magnitude of the divergence (and hence, the commonality) in the body of meanings held by those actors. This implies that the magnitude of the divergence (and hence, the commonality) did not stay at the same level over the time period of the OBAP2 project. For instance, all the design/configuration interactions that the OB providers, IT implementers and informaticists had among themselves over the second round of implementation significantly narrowed the wide understanding and expectation divergence that emerged at the end of the six-week use period. By the end of the second round of implementation, the OB providers and the IT implementers had gained much more common understandings and expectations with respect to the design flexibility limitations of the Cerner™ PowerChart® tool, on one side, and the OB workflow necessities that needed to be implemented inside the Cerner™ PowerChart® tool, on the other side. And that is why we hear A11, the CMIO, saying in retrospect that it turned out that the OB physicians were right. The CMIO, indeed, believes that it was not unrealistic and unfair

for the OB providers to insist that they could not do their job if the system did not replicate their ACOG paper format.

A schematic model of the impact of interaction among actors on the divergence/commonality of the body of meanings is presented in Figure 11.
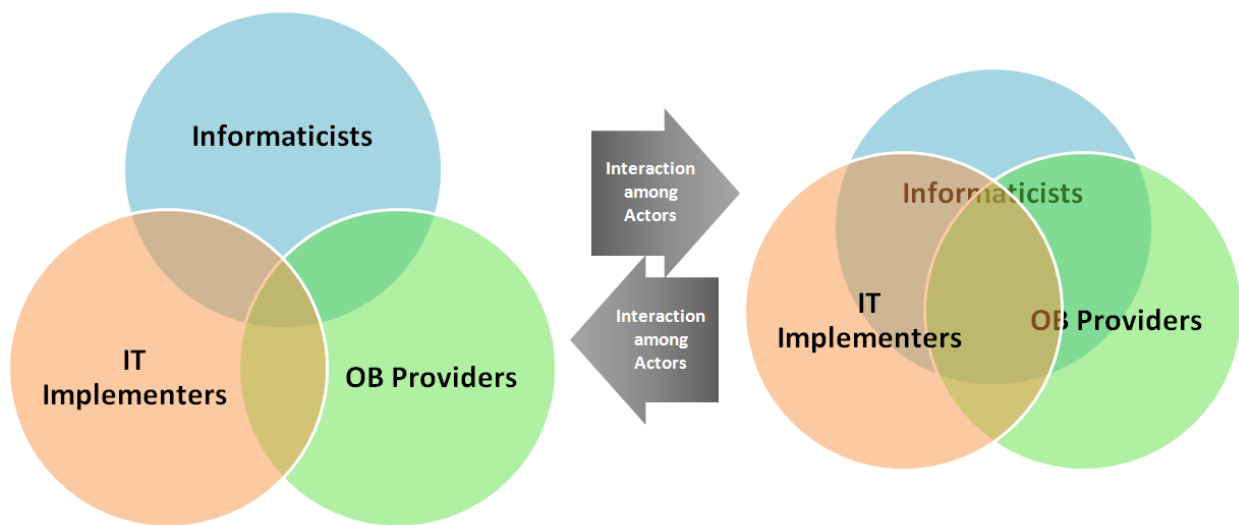
Figure 11: Larger Shared Area and Narrower Divergence or Vice Versa through Interaction among Actors

5.2.4. Perceptions of "Resistance"

The last analytical standpoint that should be addressed here pertains to understanding how the people involved in the OBAP2 project perceived the OB providers' reaction to the first roll-out of the OB-AEHR system. By looking at the interview data, one could acknowledge the notion that although different people were using different terms or phrases to describe the OB providers' reaction, a common and recurrent theme was to not consider that kind of reaction as something "bad." Therefore, it seems that the term "resistance" (with all the bad connotations that are commonly attached to it in the organizational change and IS literatures) is not suitable for describing the OB providers' reaction from the perspective of the actors involved in

the OBAP2 project. Even if one would not be thinking that the term "resistance" has a "bad" connotation, the term still did not seem to be perceived by some of the actors involved in the OBAP2 project in the same way as is prevalent in the IS literature, that is, only to describe "user"-side behaviors. For instance, A21, a nurse informaticist, uses the term "resistance" to describe the IT implementers' behavior when they were unwilling to do a special design/configuration for the OB clinic during the first roll-out. A21 says:

> Well, so then, it kind of got built into the project although there was resistance to that from the IT side, but it's like: OK! If we have to take them live and they can't function safely without a mechanism like this, what are our options?

In this context, the term "resistance" loses all its intended characterization functionality to describe the OB providers' reaction; and hence, it seems necessary to take a more inclusive, unbiased and adequate approach to conceptualizing and describing the kind of action/reaction that the OB providers (or even other actors involved in the OBAP2 project) displayed during the project. That approach can be based on using the notion of divergence, which was discussed in the previous two parts.

A divergence-based approach can be used to make an argument like the following: the kind of life the OB providers experienced during the first round of OB-AEHR implementation impelled their reaction to the first-round OB-AEHR implementation to arise mainly from their own non-shared understandings, values and expectations; and, in turn, that reaction by the end of the six-week use period added to (or, at least, kept the same level of) the pre-existing divergence of understandings, values and expectations. In this way, the OB providers' reaction to the first version of the system, which is commonly called "resistance," can in fact be viewed as a type of behavior that

has its roots in the divergence (instead of commonalities) of understandings, values and expectations. Then, in turn, that kind of behavior eventually does not decrease the magnitude of the divergence. The same structure of argument can also be employed to describe the type of behavior that the IT implementers displayed when they faced the OB providers' need to have their own customized design/configuration during the first roll-out.

On the other side, the OB providers' reaction to the second round of implementation, which might seem like "acceptance" to those who believe in the notion of "resistance vs. acceptance," can be explained in this way: the kind of life the OB providers experienced during the second round of OB-AEHR implementation impelled the OB providers' actions/reactions, during the second round of implementation, to arise mainly from the shared understandings, values and expectations they had in common with the IT implementers and informaticists. In turn, those actions/reactions by the time of the second go-live date had decreased the magnitude of divergence, which had been very high at the end of the six-week use period.

5.2.5. An Overarching Emergent Interpretive Schema

All the different analytical standpoints discussed above can be viewed together in the architecture presented in Figure 12. In fact, this architecture shows different facets of a multidimensional understanding that has been emerged from studying the OBAP2 project's case. In the figure, the tangency between two circles means that those circles, where each represents part of the ideas in the analytical standpoints discussed above, are significantly and directly related to each other in the body of interpretive understanding presented here. Also, some circles in the model are surrounded by bigger

circles, and that means that there are some lower level concepts/constructs that are part of other bigger, higher level constructs.
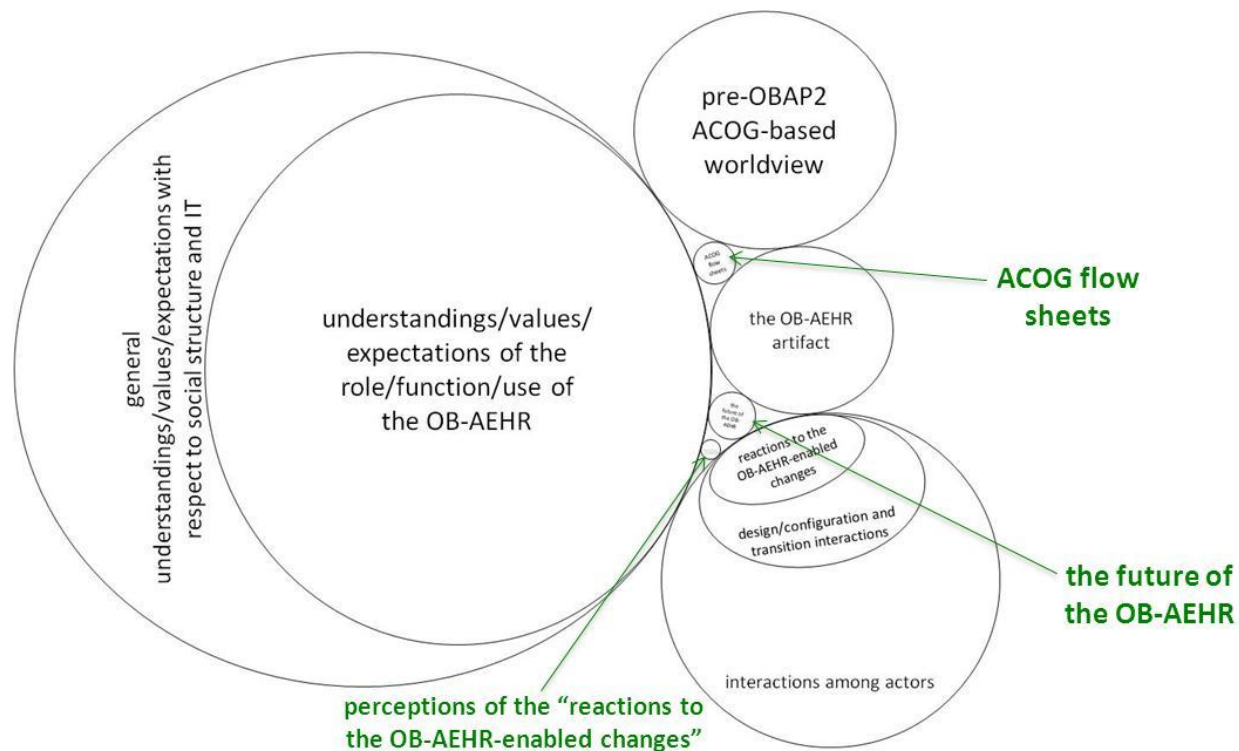
Figure 12: An Interpretive Schema/Architecture for Understanding the OBAP2 Case of IT Implementation

5.3. The Emergent Explanatory/Predictive Schemas

The type of understanding presented in the previous section can extremely and significantly inform the development of an explanatory/predictive schema. The purpose of this section, then, is to provide an explanatory schema (as opposed to the interpretive one provided in the previous section) in which a longitudinal account of antecedents and descendants of people's reactions to IT implementation could be portrayed. The explanatory schema is also intended to be used in a predictive mode to anticipate future events in a given IT implementation occasion.

This section first looks at the extant common explanatory schema found in the IS literature and then presents an evolutionary journey through which multiple versions of a proposed explanatory/predictive schema have been produced with the aim of complementing that extant common explanatory schema.
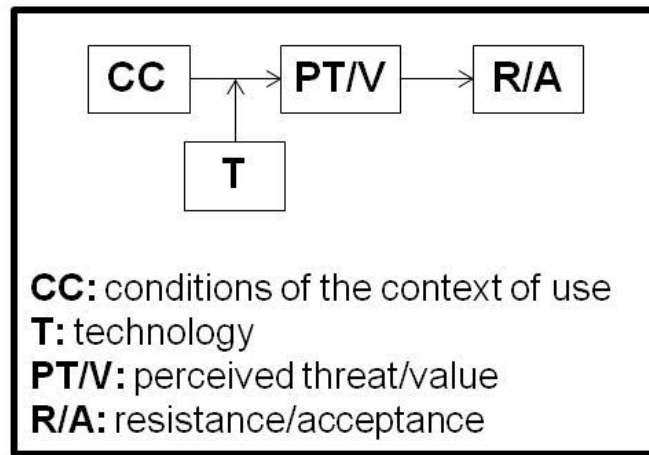
5.3.1. The Extant Common Explanatory Schema

An underlying schema can, in fact, be constructed by looking at different explanatory models in the IS literature (e.g., Polites and Karahanna 2012, Venkatesh et al. 2003, Venkatesh et al. 2012, Beaudry and Pinsonneault 2005) that are trying to portray the antecedents of "resistance" and/or "acceptance" behaviors. Such an underlying schema is presented in Figure 13.

The schema in Figure 13 shows the moderating effect of new technology (i.e., T) on the impact that the conditions of the context (i.e., CC) of a given social/organizational setting (including individual and or collective conditions) in which a new technology is being implemented can have on how an intended "user" perceives an IT implementation occasion as either valuable or threatening. Such a moderating effect is in fact, in terms of statistical modeling, a more precise translation of what is commonly known in the extant literature as the interaction between the conditions of the context and the new technology. The perceptions of value or threat can then lead to actual user behaviors, namely, "resistance" or "acceptance."

The schema presented in Figure 13 has two important properties. One major property is that it explains the cause-effect relationships leading to "resistance" or "acceptance" behaviors in a cross-sectional manner. This means that the type of modeling shown in the schema is not intended to capture potentially existing feedback

loops where "resistance" or "acceptance" behaviors could have had impact on the other constructs over time.

Another important property of the schema in Figure 13 pertains to the major assumption that the new technological element is a non-variable construct that gets no impact from any other factor/construct in a given IT implementation occasion.

Figure 13: The Extant Common Cross-Sectional Explanatory Schema

A different version of the schema presented in Figure 13 can also be identified in the literature. This different version, which is presented in Figure 14, is based on some studies (such as Lapointe and Rivard, 2005) where a longitudinal perspective has been employed. The longitudinal perspective is, in fact, employed to illustrate that "resistance" or "acceptance" behaviors at one episode in time will have a triggering impact on the next round of the behavior-forming process at a second consecutive episode in time. The model of antecedents in the second round, then, would constitute different versions of the constructs (i.e., conditions of the context, user perception, and user behavior) because of all the events, action or reactions that occurred as a result of the users' behaviors the first time round.

One thing, however, is common between the schemas presented in Figures 13 and 14. The common aspect is, in fact, related to taking the technological element and its features as something that receives no effects from other constructs and hence holds a constant and non-variable shape over time. That is why the technology construct has no time-specific subscript in Figure 14. In this sense, it seems that the two versions of the extant common explanatory schema in the IS literature discussed above portray only a portion of the whole IT implementation process, i.e. the post-design/configuration era.
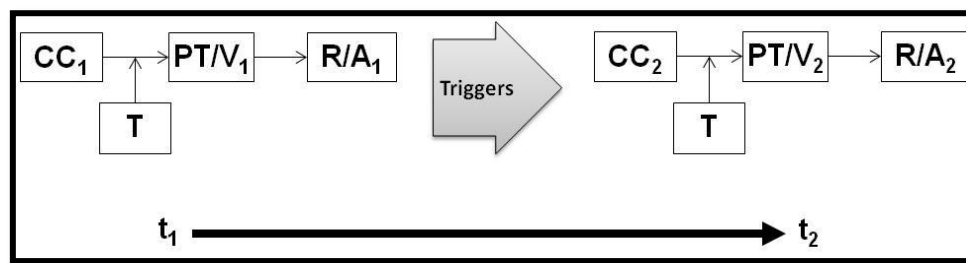
Figure 14: The Extant Common Longitudinal Explanatory Schema

5.3.2. The First Version of the Proposed Explanatory/Predictive Schema

The journey of developing a new explanatory schema in this current research primarily started with the intent to complement the extant explanatory schema found in the IS resistance/acceptance literature.

The initial exposures to the OBAP2 project's case along with the insights gained from the organizational change management literature, the "processes for organization meanings" (POM) model (see Chekland and Holwell, 2002), and the sociology (i.e., phenomenological sociology, see Lee, 1991 and Schutz, 1973) literature led to the notion in this current research that such occasions as information technology implementation are, first and foremost, meaning-making (as opposed to technology-making) occasions.

The first-version schema, presented in Figure 15, was designed to capture the notion presented above. In the this schema, the relationships among users' lived experience (ULE), collective-level body of meaning (CBM), and users' reaction (UR) (as opposed to users' "resistance" or "acceptance") were considered to illustrate the meaning-making aspect (or process) in an IT implementation occasion. On the other hand, the concept of "meaning" was considered to cover all understandings, values and expectations that users would hold with respect to either old or new IT they would be interacting with in their workplace. On this basis, the schema in Figure 15 reads like this: by launching an IT implementation project, users become engaged in their day-to-day organizational life in a process whereby they try to make sense out of a new technology (i.e., T_t) that is being implemented, within the confines of what already makes sense to them in terms of their own understandings, values and expectations (i.e., CBM_{t-1}) regarding the role/function/use of a certain build of a technological artifact (i.e., T_{t-1}) they have already been using. This kind of daily life-experience of technology implementation would lead users to collectively contribute to forming a new body of understandings, values and expectations (i.e., CBM_t) regarding the role/function/use of technology in their workplace. That new body of understandings, values and expectations would, in turn, give rise to users' reaction to the IT implementation effort. And finally, users' reaction could affect in a recursive manner the design/configuration of the new technology being implemented as well as the conditions of the context.
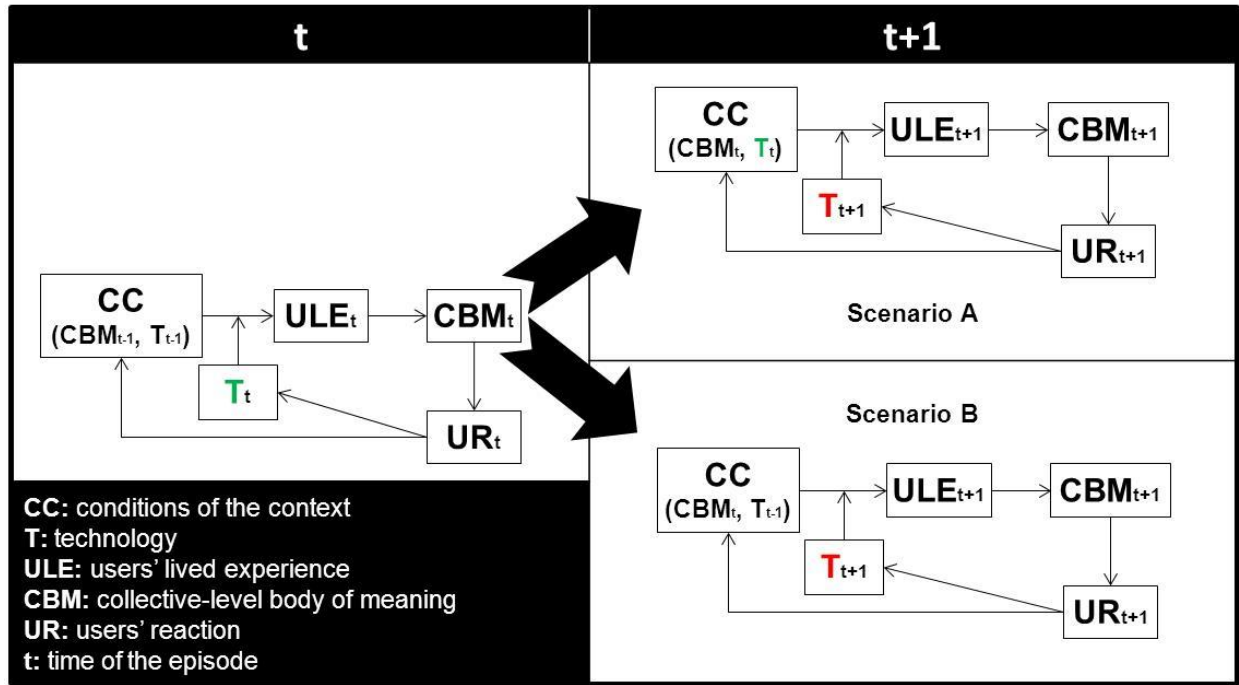
Figure 15: The First Version of the Proposed Explanatory Schema

The schema presented in Figure 15 also demonstrates a longitudinal aspect. From the longitudinal point of view, an implementation effort at time *t* could lead to the new technology at time *t* becoming the technology in use at time *t+1* (i.e., scenario A); or the effort might lead to the old technology at time *t* remaining the technology in use at time *t+1* (i.e., scenario B). Either way, a newer technology (i.e., T_{t+1}), again, could be introduced at time *t+1,* where the conditions of the context would be totally different from the one at time *t*, mainly due to the fact that the new body of understandings, values and expectations that were formed at time *t* (i.e., CBM_t) are now part of the context at time *t+1*.

5.3.3. The Second Version of the Proposed Explanatory/Predictive Schema

The first version of the proposed explanatory schema, however, had its own problems. One major problem was related to the fact that the schema was looking only

at the users' side life-experience in a given IT implementation occasion, and this was not compatible with the later findings from the OBAP2 project case study or with the insights provided in the modern change management literature, such as the work of Ford et al. (2008), who say:

> The change agent-centric view [does not] consider the possibility that change agents contribute to the occurrence of what they call "resistant behaviors and communications" through their own actions and inactions, owing to their own ignorance, incompetence, or mismanagement.

On this basis, a balanced and unbiased approach towards understanding organizational change is, in fact, the one that enables us to see organizational change events as occasions where multiple groups of stakeholders collectively and simultaneously contribute to the process and outcomes of organizational change. Taking into account that view, the schema in Figure 15 was changed in order to illustrate a meaning-making process in which all the involved actors' (not just users') lived experiences (i.e., ALIE or ALPE) and reactions (i.e., AR) are considered during any given IT implementation process. With that change, the CBM construct was also redefined to represent a more inclusive body of meaning composed of partially shared, yet divergent understandings, values and expectations belonging to different stakeholder groups who would be interacting with either old or new IT during an IT implementation process.

Another major problem in the first-version explanatory schema was related to the notion that the schema was not portraying an adequately detailed stage-by-stage view of an IT implementation process. In other words, the schema was not making a distinction between the implementation era (see the episodes ei_t and ei_{t+1} in Figure 16), where a new technology that is not part of an organizational context is being introduced, and the

post-implementation era (see the episodes ep_t and ep_{t+1} in Figure 16), where the new technology has become part of the organizational context and is being used.

The second version of the explanatory schema was therefore designed to capture the above two important changes. The result is shown in Figure 16.
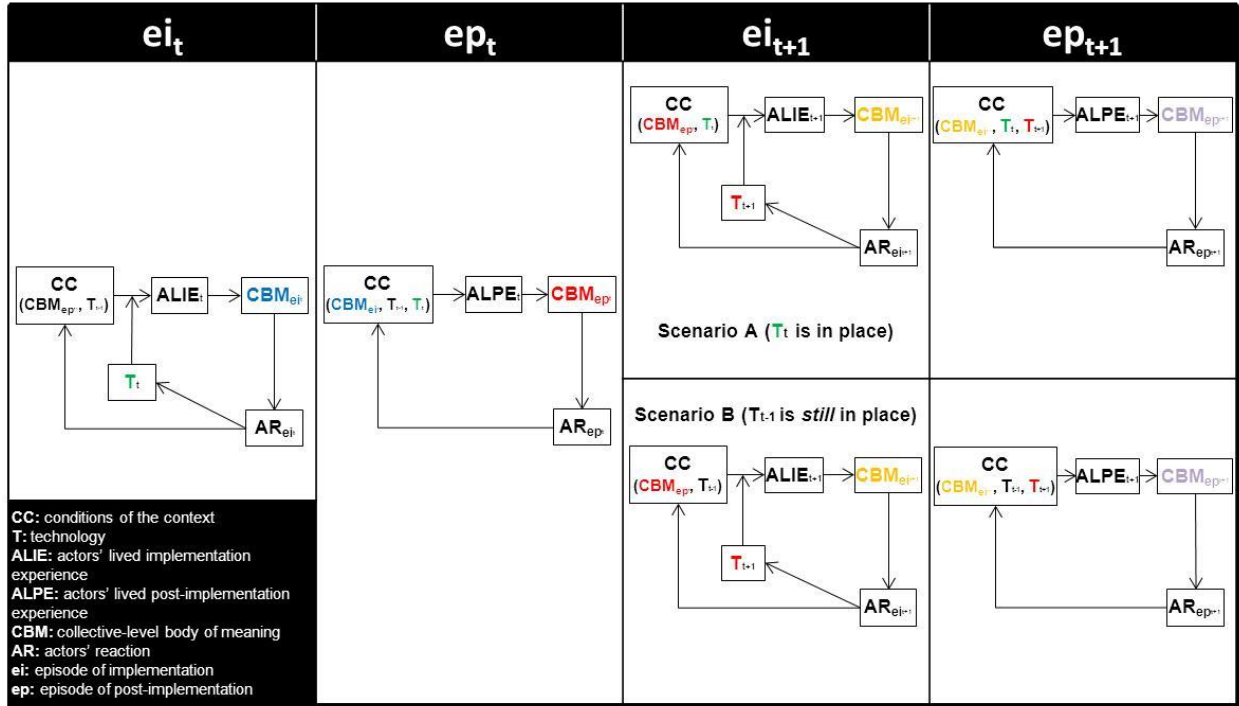
Figure 16: The Second Version of the Proposed Explanatory Schema

The second-version schema also contends that during each time episode, contingent on whether the episode pertains to the actual implementation of new IT or is related to the post-implementation era, actors will have a certain type of lived experience that is distinct from the one they might have during another time episode. On this basis, it can be seen from the second-version schema that a distinction has been made between the actors' lived implementation experience (i.e., ALIE) and the actors' lived post-implementation experience (i.e., ALPE). This distinction, at the time of crafting the second-version schema, was considered to be useful in order to capture the

specificities of implementation and post-implementation eras. However, the presentation of this kind of perspective subsequently changed by the time of crafting the third-version schema.

5.3.4. The Third Version of the Proposed Explanatory/Predictive Schema

There were several reasons that made crafting a third version of the proposed explanatory/predictive schema inevitable. One major reason was that the illustration of the different stages of the IT implementation process was not as precise and accurate as it could be in the second version of the schema. On the other hand, the illustration of all possible scenarios inside one graphical shape was too cumbersome in terms of showing distinct subscripts and construct names for all possible implementation scenarios and episodes. On this basis, the third version of the schema was designed according to the idea that each stage or episode of IT implementation process can have its own standalone and general-form graphical presentation. Therefore, four separate schemas were designed to illustrate design/configuration, transition, post-implementation and rollback episodes. All these four schemas are shown in Figures 17 through 20.

The schemas presented in Figures 17 through 20 entail some major differences compared to the second-version schema presented in Figure 16. One important difference relates to the CBM construct. Aligned with the final findings from the OBAP2 project's case study as well as the insights gained from such studies as Lapointe and Rivard (2005) and Markus (1983), the CBM construct in the third-version schemas is assumed to be capturing understandings, values and expectations not only about technology, but also about social aspects of people's everyday organizational lives. Another major change in the third-version schemas pertains to the definition of the

conditions of the context (i.e., CC$_t$) construct. The third-version schemas maintain that the initial conditions of the context in any of the four implementation episodes (if they are considered isolated episodes) could be a product of an interaction among at least three enduring elements inherited from the past. These elements are social structure (i.e., SS$_{t-1}$), technology already in use (i.e., T$_{t-1}$), and the body of meaning (i.e., CBM$_{t-1}$) held by actors that consists of those actors' understandings, values and expectations with respect to the other two elements (i.e., SS$_{t-1}$ and T$_{t-1}$). In this sense, CC could be seen as an approximate function of the interaction among SS$_{t-1}$, T$_{t-1}$ and CBM$_{t-1}$. The mathematical operationalization of such relationship between CC$_t$ and its elements can, then, be written in this format:

$$CC_t \sim f(SS_{t-1} \times T_{t-1} \times CBM_{t-1})$$

Another major property that is common across all the four schemas in the third version of the proposed explanatory/predictive account pertains to the impact of the actors' lived experience (i.e., ALE) on how the body of meanings held by the actors (i.e., CBM) would give rise to the actors' action/reaction (i.e., AA/R). In other words, in the third-version schemas, it is contended that the way in which actors experience their organizational life could affect whether their consequent action/reaction would be arisen from the divergence or from the commonalities existent in the body of meanings.

Additionally, one more new property in the third-version schemas is related to a change compared to the first- and second-version schemas. In those two past versions, the actors' reaction was assumed to have an impact on the conditions of the context. However, by the time of crafting the third version, it became understood that the conditions of the context, since it is inherited from the past, should be treated as a

constant or fixed-value construct. Instead, the actors' reaction can have an impact on how the actors experience life in the present time, confined to the initial set of conditions of the context, and that life experience eventually could lead to a new set of conditions of the context (i.e., CC_{t+1}), which, in turn, would be the initial conditions of the context for a possible next episode.
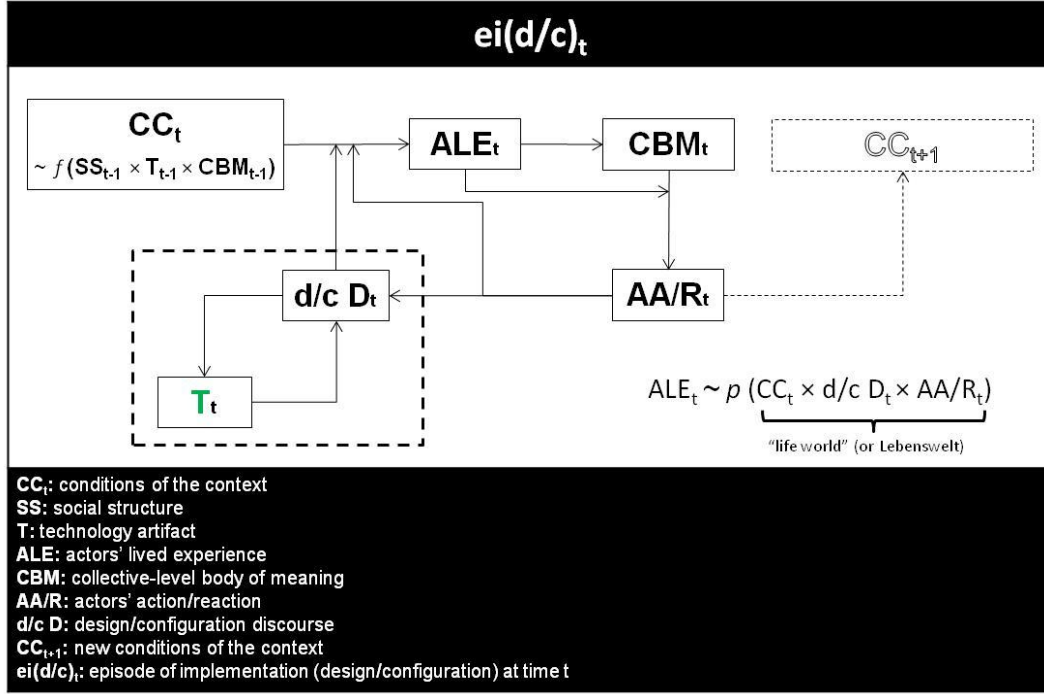
Figure 17: The Third Version of the Proposed Explanatory Schema (Episode of Design/Configuration)

Each of the episodes related to one of the four implementation phases also has its own specificities. On this basis, the design/configuration episode shown above in Figure 17 entails a special design/configuration box (with a dotted outline) that represents the fact that during the design/configuration episode there would be a cyclic process going on to either design a piece of technology artifact from scratch or configure a technology artifact in order to make it ready for actual use. In such a cyclic process, the design/configuration discourse (i.e., d/c D) is an arena where inter-subjective creation

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of design/configuration-related meanings happens (see Chekland and Holwell, 2002, p. 105). In this sense, the discourse (and not the technology artifact itself, in this episode), on one hand, could directly affect the daily life of actors, some of whom might also be involved in the design process; and, on the other hand, it also could be affected by some earlier actors' action/reaction.

On the basis what is discussed above as well as what is shown in Figure 17 about the design/configuration episode, one can then build a mathematical operationalization of how the actors' organizational life experience could be affected by the constituting factors of a design/configuration occasion. The format of that mathematical operationalization could be this:

$$ALE_t \sim p \, (CC_t \times d/c \, D_t \times AA/R_t)$$

In the above formula, actors' lived experience is shown as an approximate function (i.e., p) of the interaction among the conditions of the context, design/configuration discourse, and actors' action/reaction. From a phenomenological sociology perspective (see, for example, Lee 1991 and Schutz 1973), it could be understood that the aforementioned type of interaction, in fact, could be taken as referring to the concept of "life world" or "*Lebenswelt*." Therefore, the above formula can be basically read in this manner: the actors' lived experience is an approximate function of the arena in which their day-to-day common-sense thinking and meaning-making arise (i.e., "life world," see Lee, 1991).

As a last comment on Figure 17, it should be noted that the new conditions of the context (i.e., CC_{t+1}), as Figure 17 suggests, can be simply mathematically operationalized as an approximate function of the actors' action/reaction:

$$CC_{t+1} \sim g \, (AA/R_t)$$

The above formula, however, could be used to derive other mathematical operationalizations that could be more useful in terms of giving a better picture of any given design/configuration occasion. One important derivation of the above formula is:

$$CC_{t+1} \sim h \, (ALE_t \times CBM_t)$$

In this formula, it can be seen that, similar to the first- and second-version schemas, the collective-level body of meanings will actually be transferred to any possible next episode of IT implementation and will form part of the conditions of the context in that new episode. On the other hand, another important mathematical operationalization that could be derived from the above formula is this:

$$CC_{t+1} \sim i \, (CC_t \times d/c \, D_t \times AA/R_t)$$

The above formula shows that the new conditions of the context that is being formed during any given design/configuration episode can be viewed as an approximate function of the emergent "life world" in that episode. On the other hand, the above formula can be considered a general form of the particular political perspective that Markus (1983) presents in order to explain MIS implementation occasions. In her political perspective model, Markus (1983) shows that the "power shift realized in organizations" (i.e., CC_{t+1} in the current schema) is a function of the interaction between "resistance" (i.e., AA/R_t in the current schema), "political tactics" related to "design process" and "implementation activities" (i.e., $d/c \, D_t$ in the current schema), and "organizational power distribution" (i.e., CC_t in the current schema).

Another third-version schema pertains to the transition episode. This episode is shown in Figure 18. This is an episode where all actors start to directly interact with the new technology artifact while the old technology is still in use. In a transition episode, the format of the mathematical operationalization for the actors' lived experience, therefore, will be changed to the following:

$$\text{ALE}_t \sim p \, (\text{CC}_t \times \text{T}_t \times \text{AA/R}_t)$$

From the above formula, it can be understood that the emergent "life world" during a transition episode would be different from the one during a design/configuration period, where the primary change factor in a transition episode would be the new technology and its features and the role that they would be having in shaping the "life world" of actors.
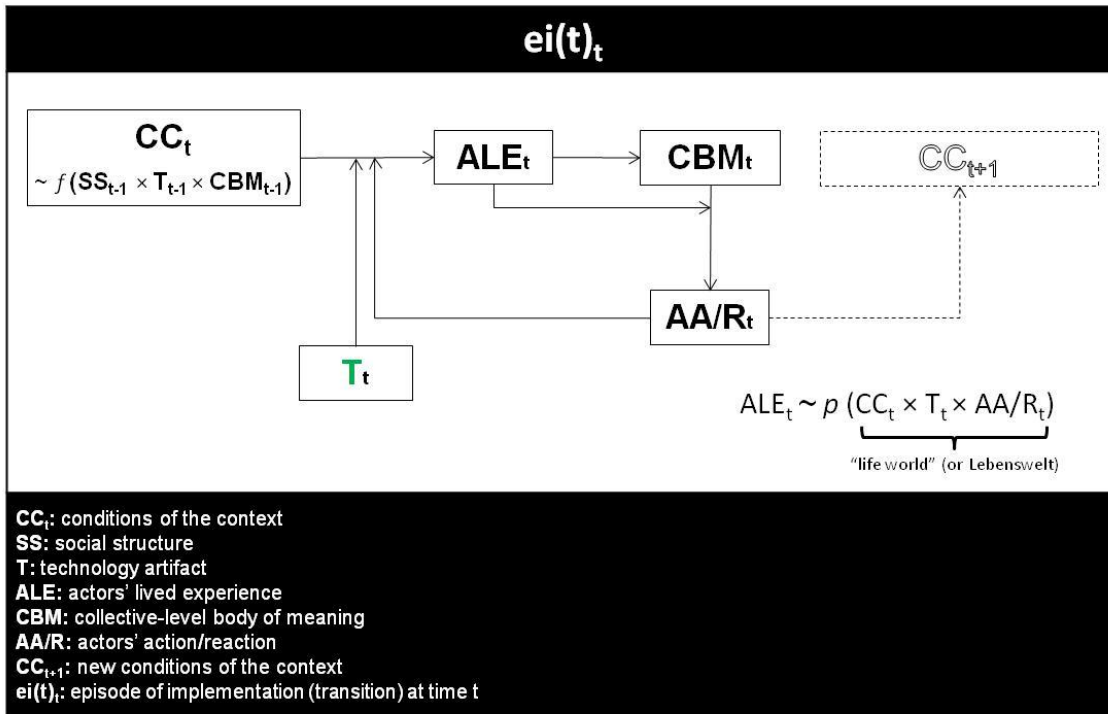
Figure 18: The Third Version of the Proposed Explanatory Schema (Episode of Transition)

The third schema is related to the post-implementation episode. The schema for this episode is shown in Figure 19. The post-implementation episode is an occasion where no new technology introduction is happening and a certain build of a technological artifact is in full use. In a post-implementation episode, the format of the mathematical operationalization for the actors' lived experience, again, will be changed. The new format would be:

$$ALE_t \sim p\,(CC_t \times AA/R_t)$$

On the basis of the above formula, it can be seen that the emergent "life world" during a post-implementation episode would be different from the one during design/configuration and transition periods.
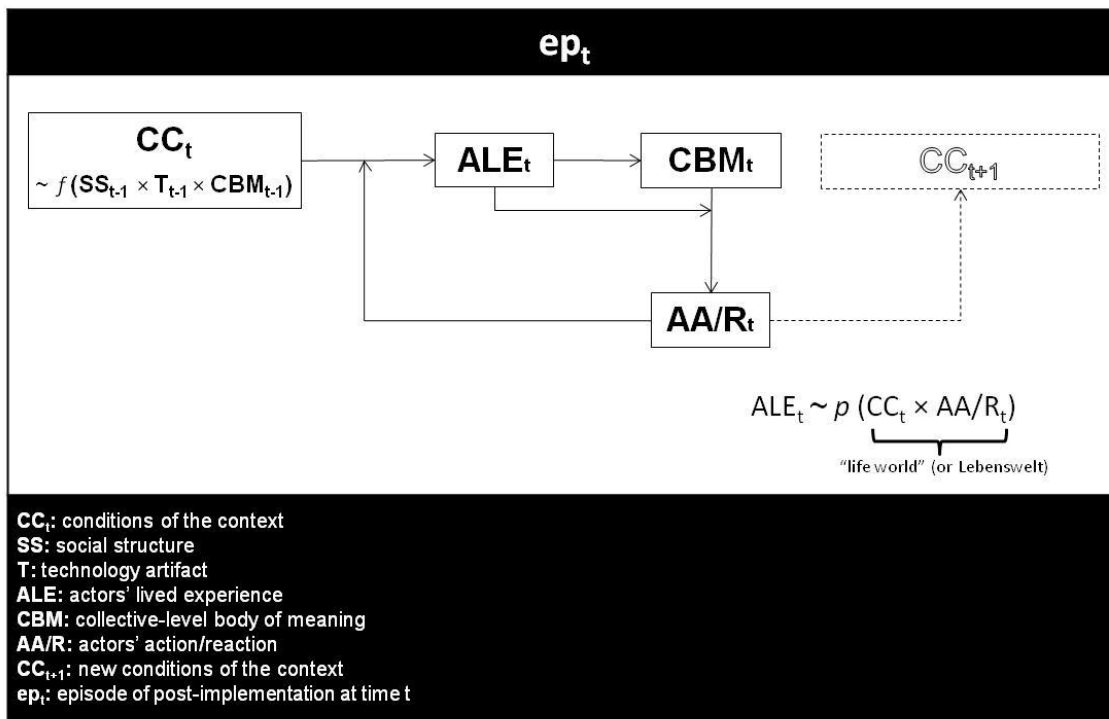
Figure 19: The Third Version of the Proposed Explanatory Schema (Episode of Post-Implementation)

The last episode that sometimes occurs in some IT implementation occasions is the implementation rollback episode. The schema for this episode is depicted in Figure 20. The rollback episode, which could happen after either a design/configuration or a transition episode, is an occasion where an older technology that had been in use prior to the introduction of a new technology returns to the organizational setting as the only technology in use.

In a rollback episode, the format of the mathematical operationalization for the actors' lived experience will be the same as the one for the post-implementation episode. The format, then, would be:

$$\text{ALE}_t \sim p\ (\text{CC}_t \times \text{AA/R}_t)$$
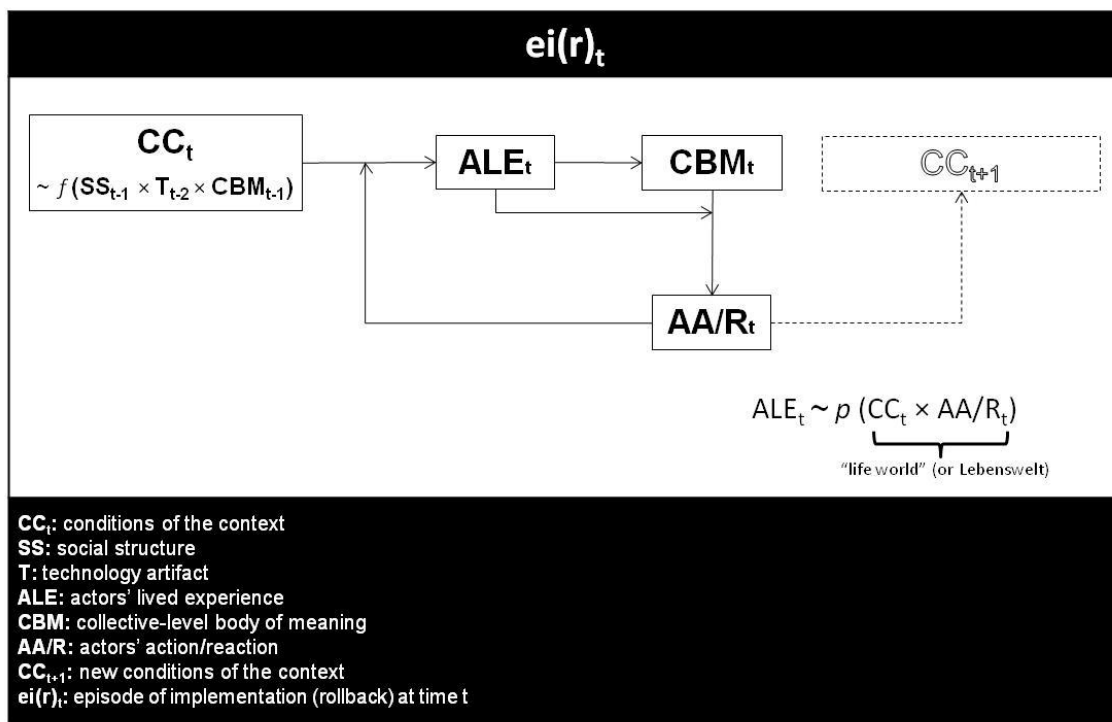
Figure 20: The Third Version of the Proposed Explanatory Schema (Episode of Rollback)

The last piece in the third-version explanatory/predictive schema is a table that shows how the above four separate episodes could lead to each other in any given IT

implementation occasion. The table is shown in Figure 21. The underlying idea in the table can be seen as an extension of the "expectation failure" notion originally presented by Lyytinen and Hirschheim (1987). Lyytinen and Hirschheim (1987), in their classic survey on IS failures, present the "expectation failure" concept in order to emphasize "the importance of understanding how various stakeholders perceive and comment on the value of IS" where "[IS] failure [should be seen] as an embodiment of a perceived situation" (Lyytinen and Hirschheim, 1987, p. 264). In this sense, and from the "expectation failure" perspective, it is acknowledged that multiple stakeholder groups holding different understandings, values and, most importantly, expectations are involved in any given IT implementation occasion; and whenever the IT implementation process, activities and outcomes fail to meet the expectations of any certain stakeholder group, then the IT implementation would be seen as a failure from the perspective of that group.

In this current research, the "expectation failure" notion is extended in the sense that, in addition to taking human subjects' own perspectives (i.e., first-level constructs) into account, the notions of both "failure" and "success" are defined from the perspective of an observing researcher (i.e., second-level construct). On this basis, from the perspective of an observing researcher, any given IT implementation episode (clearly, not including the post-implementation episode) is a "failure" when the process and activities during that episode fail to narrow down the divergence among diverse understandings, values and, most importantly, expectations held by different involved stakeholder groups, even if that particular IT implementation episode might be deemed a "success" from the perspective of a certain involved stakeholder group. On the other

hand, again from the perspective of an observing researcher, if the process and activities during a given IT implementation episode decreases the divergence among diverse understandings, values and expectations held by different stakeholder groups, then that IT implementation episode can be considered a "success," even if it might be deemed a "failure" from the perspective of an involved stakeholder group.

According to what is stated in the previous paragraphs, the table presented in Figure 21 shows that, during any given IT implementation episode, by comparing the magnitude of the divergence of the initial CBM (i.e., CBM_{t-1}) to the magnitude of the divergence of the secondary CBM (i.e., CBM_t), which will emerge as a result of all interactions among actors during that particular IT implementation episode, one could predict the type of the succeeding episode of IT implementation. For instance, the cell where the circle labeled "1" exists can be read in this way: if you are at the transition episode (i.e., at the column titled i(t)) and the interactions among actors during that episode has led the divergence of the CBM are shrunk, then it is very likely that the next episode would be post-implementation (i.e., p).

	i(d/c)	i(t)	p	i(r)
div(CBM$_t$) > div(CBM$_{t-1}$)	i(r)	i(r)	i(r) / i(d/c)	i(r)
div(CBM$_t$) < div(CBM$_{t-1}$)	i(t)	① p		i(d/c)
div(CBM$_t$) = div(CBM$_{t-1}$)	i(t)	p		

Figure 21: The IT Implementation Trajectory Propositions Table

There are some other features in the Figure 21 table that are worth commenting on. One relates to the row shown in red. That row, in fact, represents those situations where the divergence between diverse understandings, values and expectations held by

different stakeholder groups is not sensitive to and gets no impact from the IT implementation actions and interactions during a given IT implementation episode. One possible explanation for such situations could be derived using the concept of "workaround." On this basis, therefore, Figure 21 shows that "workaround" situations are occasions where the IT implementation process, on the surface, proceeds very similarly to a regular IT implementation process, which is shown in the second row of the table. However, appealing to the literature's concept of "workaround," it seems very likely that issues related to "meaningful use of IT" would occur in the future in organizational settings that experience those kinds of situations.

Another important point about the table in Figure 21 relates to the implementation rollback (i.e., i(r)) column. On the one hand, it should be noted that the yellow cell in that column represents those situations in which an organizational setting is in a rollback episode and the divergence of CBM keeps growing, so there is a possibility of severe power plays and political battles emerging that could override the whole idea of IT-involved change in that organizational setting (see, for example, cases 1 and 3 in Lapointe and Rivard, 2005). On the other hand, it should be noted that the empty cell at the confluence of the rollback column and the third row, indeed, represents the fact that it can hardly be imagined that an organizational setting that is currently experiencing an implementation rollback episode could be considered a non-sensitive environment to the IT implementation effort, specifically in terms of changes in the divergence of CBM. In fact, if that specific organizational setting had not been sensitive enough to the IT implementation effort, a rollback probably ought never to have happened in the first place.

The last point about the Figure 21 table pertains to the post-implementation column (i.e., p). First of all, the table shows that if any given organizational unit or organization is at the post-implementation episode, the divergence of CBM will always be growing over time. This kind of phenomenon could happen because of such factors as changed user needs and requirements or, more likely, advancements in the IT world. If IT people in a given organization start either to meet users' needs or propose a new IT based on the advancements in the IT world, it will be likely that a new episode of design/configuration could get started. However, in other cases, such as the one in which the reason for the divergence of the CBM's keeping growing is users' issues with the technology they are using and those issues are not being appropriately addressed by IT people, there would be a strong chance of going back to the previous version of technology (i.e., rollback).

The last comment about the explanatory/predictive schema presented in this chapter is fully captured in this quote from Chekland and Holwell (2002, p. 107):

> Real life itself is always richer and more complex than any of our images of it … a terrain is never the same as a map which relates to it.

6 DEDUCTIVE TESTING, DISCUSSION AND CONCLUSION

6.1. Introduction

The purpose of this chapter is to deliver some post-hoc arguments with respect to the schemas presented in the previous chapter. One major argument relates to the fact concerning how well the explanatory/predictive schema presented in chapter 5 could explain/postdict the IT implementation incidents and/or trajectory that occurred in the OBAP2 project. Delivering this type of argument, in fact, will satisfy the empirical requirements (see Lee 2004, Popper 1965) with respect to the explanatory/predictive schema presented in chapter 5 embodying a truly *social* theory.

Connected to the first argument described above, another major argument provided in this chapter pertains to the notion of how well the schemas presented in the previous chapter manifest what was called in chapter 3 of this dissertation *the socio-technical systems imagination*. This type of argument is very important, especially because it shows how the schemas presented in chapter 5 are actually filling the theoretical gap identified in the literature at the end of chapter 2.

The last argument item presented in this chapter addresses the second research question posed in chapter 1. The argument, therefore, considers the idea of how the schemas presented in chapter 5 could be leveraged to generate prescriptions that could

be novel and insightful in regard to the management of and research on IT implementation occasions.

6.2. Deductive Testing of the Proposed Explanatory/Predictive Schema

Central to the explanatory/predictive schema presented in chapter 5 is the concept of "divergence in the collective-level body of meaning" (i.e., div(CBM)). Here, one salient argument presented in chapter 5 is that dynamics of any given IT implementation occasion can be explained/predicted by observing the dynamics of div(CBM) during that occasion. This argument was captured in an implementation-episode-based manner in the IT implementation trajectory propositions table (see Figure 21) presented at the end of chapter 5.

The purpose of this section is to deductively test the explanatory/predictive power of the IT implementation trajectory propositions table using the available field-based evidence from the OBAP2 project's case.

Using the field-based evidence from the OBAP2 project's case study, one can reasonably distinguish these narratives with respect to each of the episodes of the OBAP2 project:

1. The time before the OBAP2 project got started can be seen as a post-implementation era when no new documentation technology introduction was happening and the OB providers were happy with the documentation (or charting) technology they had (i.e., the ACOG flow sheets, T_{t-1}). At that time, however, the CMIO along with the OCT team had started to feel that due to several factors (e.g., healthcare IT advancements, federal government mandates, institutional healthcare IT development plans, etc.) there is a major need to

computerize the clinical documentation workflows across all the university health system clinics, including the OB clinic.

2. In late 2010, the OBAP2 project started with a design/configuration episode when most OB providers were not thinking that the project was that important or necessary or even hoped that their medical department and clinic could be excluded from the ambulatory EHR implementation project. In other words, the project started in an atmosphere where there was a big gap, specifically between the IT people's and the OB providers' mindsets about the project and its necessity; and the interactions happening during that episode were not helping to narrow that gap. With the OB providers remaining mostly apathetic to the project, the first version of the OB-AEHR tool (i.e., T_t) went live on July 13, 2011.

3. After the go-live date on July 13, 2011, the OB providers started, in a fairly transitional mode, to use the OB-AEHR tool while they were still doing some parts of their job using the ACOG flow sheets. During this time, having direct exposure to the OB-AEHR tool, the OB providers mostly came out of their apathetic mode and started to raise issues and concerns about the OB-AEHR tool and its effect on their clinical practice. In this sense, the mindset gap, which had initially emerged in the phase 1 as mentioned above, became wider and led to suspension of the use of the OB-AEHR tool through an email sent out by the OB/GYN department chair.

4. Although the OB providers went back to using their own ACOG flow sheets, they already had started to realize the importance of the project for the institution and also the advantages that a well-designed OB-AEHR tool could have for their own

clinical care. This was a moment when, for the first time during the project, the mindset gap mentioned above started to shrink. Such a shrinkage in the mindset gap led to another round of design/configuration getting started fairly soon after the suspension of the first-version OB-AEHR tool.

5. The deep and prolonged interactions during the second design/configuration round narrowed the mindset gap even further and led to a second go-live of the system on September 18, 2012.

6. With a much more organized transition episode, compared to the one in the first roll-out, the second roll-out expanded the common ground between the OB providers and the IT people, and this led to the second-version OB-AEHR tool becoming the only documentation technology in use for the day-to-day clinical care in the OB clinics.

Having all the above six narratives in mind, one could clearly see that the incidents that happened during the OBAP2 project could be adequately explained/postdicted using the IT implementation trajectory propositions table. The table presented below, therefore, shows the trajectory of the OBAP2 project in terms of all those six episodes that the project went through.

	i(d/c)	i(t)	p	i(r)
$div(CBM_t) > div(CBM_{t-1})$	i(r)	③ i(r)	① i(r) i(d/c)	i(r)
$div(CBM_t) < div(CBM_{t-1})$	i(t)	⑤ ⑥ p		④ i(d/c)
$div(CBM_t) = div(CBM_{t-1})$	② i(t)	p		

Figure 22: The IT Implementation Trajectory Propositions Table – The Case of the OBAP2 Project

6.3. The Proposed Body of Theory as the Embodiment of the Socio-Technical Systems Imagination

As was discussed in chapters 2 and 3, the notion of *socio-technical systems imagination* refers to an essential intellectual quality, the understanding and acquisition of which can significantly contribute to the task of building better IT implementation theories. The purpose of this section, therefore, is to argue that the proposed body of theory in chapter 5 embodies this kind of imagination.

As is declared in chapter 3, the understanding and acquisition of the *socio-technical systems imagination* by an IS researcher must lead him/her to building a body of IS theory that entails certain characteristics. On this basis, the following items show that the interpretive and explanatory/predictive schemas proposed in chapter 5 do entail those characteristics originally presented in chapter 3, section 3.2:

- The proposed interpretive and explanatory/predictive schemas constitute a social theory because:
  - they address both first-level and second-level constructs, as they are discussed by Lee (2004, p. 8) according to the conceptualization provided by Schutz (1962);
  - they address a social structure (as a form of social object) that enables, constrains and otherwise shapes behaviors and thoughts of all different generations of individuals who enter, pass through and leave a given social setting;
  - they satisfy all the logical and empirical demarcation requirements set out by Popper (1965), as generally depicted in section 6.2.

- The proposed interpretive and explanatory/predictive schemas embody the notion of sociological imagination presented by C. Wright Mills (1959) because they address the fact that how pre-implementation-time individual-level stories/worldviews, collective-level constructs, and the materiality of technology in use, being inherited from the past as interacting enduring elements, crucially shape the context of any given IT implementation occasion.

- The proposed interpretive and explanatory/predictive schemas maintain a systems perspective because:

  o they address mutually constitutive relationships that are ongoing between the technical and the social, especially during the design/configuration episode;

  o they take into account the notion of multi-stakeholder environments in which several different groups of stakeholders (not just intended "users") holding partially shared but divergent understandings, values and expectations contribute to IT implementation outcomes through their own actions as well as their interactions with other stakeholders.

6.4. Answering the Second Research Question

The kind of perspective inherent in and offered by the interpretive and explanatory/predictive schemas presented in chapter 5 can be leveraged in order to provide novel and insightful answers to the second research question in this current research. The question, as it was posed in chapter 1, is:

What novel practical and research prescriptions follow from the perspective of the new theory?

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6.4.1. Practical Prescriptions

The empirical and theoretical findings in this current research suggest that IT executives and practitioners ought to adopt a new mindset towards IT implementation projects. According to this new mindset, "engagement" should be sought after, not "acceptance," and "apathy" should be minimized, not what is commonly known as "resistance." The new mindset, in fact, implies that any given IT implementation occasion is not simply about a one-way relationship between IT implementers and "users" in which IT implementers would be offering a "pre-determined" and "by-nature-appropriate" piece of technology and "users" would be either "accepting" or "resisting" that piece. Instead, the new mindset is based on the idea that any given IT implementation occasion is an arena where an appropriate design/configuration of a piece of technology is being shaped by the engagement of and interactions among different stakeholder groups, including those people who are commonly called "users." The new mindset, therefore, advocates a much-closer-to-real-world perspective where it is believed that in most IT implementation occasions nobody (including IT implementers) really knows what is the final appropriate piece of technology until it actually emerges over the course of a project through engagement of and interactions among relevant stakeholder groups.

The aforementioned mindset has one other major implication which is the notion that, contrary to the common, traditional belief wherein technology is deemed the driving force of organizational change, the human-side actions, reactions and interactions are what drive change in organizations. Lorenzi and Riley (2000) explain this thus:

Common wisdom suggests that technology drives change in the organizational environment, but common wisdom is wrong. Instead, information technology is a powerful enabling force that creates new options and opportunities in the environment for what organizations produce—whether goods or services—and how they produce it. The early response by innovative players drives change.

This mindset, then, can result in the following four major prescriptive insights (among others) that could be useful for IT executives and practitioners, provided that those executives and practitioners have the four judgment calls proposed by Lee and Baskerville (2012) in mind before trying to generalize the prescriptions given here to their own settings.

The first prescription is:

When people raise issues about a new technology, listen to them, work with them, and don't be, by default, resistive to customizing the new technology for them.

Connected to this prescription is the following insight from the IT implementation literature. Several major studies in the literature (e.g., Lapointe and Rivard, 2005) show that problematic and sad-ending IT implementation projects, most of the time, begin with "users" having only concerns about the features of a technology being implemented. Power plays and political battles mostly start after those concerns do not get sufficient attention from the IT implementers' side. Therefore, an intuitive best practice to be followed by IT practitioners seems to be to take care of IT-artifact-related concerns before they snowball into bigger, much more complicated issues. In this sense, it seems quite relevant for IT practitioners to think about overall, long-term, mostly socio-political costs (not just technology customization costs) when they encounter people's requests for technology customization during IT implementation projects.

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The second prescriptive insight is:

Don't take smooth and painless IT implementations, by default, as successful IT implementations. Do follow-up investigations on "meaningful use."

The notion of "meaningful use" has received much attention in the healthcare IT domain. In particular, the "meaningful use" regulation refers to certain objectives and measures set out and used by the U.S. government in the past few years to assess and make sure that healthcare organizations and providers not only adopt healthcare IT tools, but also use them to achieve significant improvements in care (for example, see Blumenthal and Tavenner, 2010). Although defined primarily in the healthcare IT area, the notion of "meaningful use" seems very relevant and crucial in other IT utilization contexts as well. IT implementation projects that do not lead to "meaningful use" of technology could be, in effect, a huge waste of time, energy and money for all stakeholder groups involved in those projects. On the other hand, the lack of "meaningful use" is more likely to occur in those projects where everything is going smoothly on the surface, but the reality is otherwise—i.e. people who are expected to use a new IT tool are generally apathetic and do not feel engaged. This kind of projects, most of the time, will end up with various types of hidden workarounds in the use of newly designed IT tools. In fact, in many cases in which IT implementers and managers think that a given IT implementation effort has been successful because nobody actively and visibly "resisted" it, there might be harmful workarounds ongoing behind the scenes. Therefore, the most harmful and undesirable thing that could happen to IT implementation initiatives is not what is commonly called "resistance," but "workarounds." Although workarounds could sometimes be beneficial by helping to

identify dysfunctional IT or IT use procedures (see Bagayogo et al., 2013), this kind of benefit, most of the time, is vastly counterbalanced by high costs of subsequent rounds of corrective IT implementation, because workarounds are usually so covert and hard to detect in the short term. This kind of perspective, hence, shows why critical, visibly concerned people should be treated as a resource. In line with the ideas proposed by Ford et al. (2008), this current research study contends that all IT implementers need to leverage reactions (especially those that might seem to be "resistance") as a resource to generate outcomes such as decreasing the possibility of embracing bad IT, keeping new conversations about IT-involved changes alive and increasing people's engagement with IT-involved change processes.

The third prescriptive insight has the strongest link to the particular situation observed in the OBAP2 project, where one key determinant of how the trajectory of the project over the two rounds of implementation unfolded was the role of physicians as liaisons. As was discussed in chapter 4, both the nature of the liaison role and the individuals (i.e., the physicians) playing that role changed over the course of the OBAP2 project. That change was a key factor in why the failed roll-out in the first round turned into a successful (at least, at some levels) roll-out during the second round, where the new liaison physicians felt that they were really engaged and also were having enough influence and power to sell the revised OB-AEHR to other providers. So:

> *It is not only enough to have liaisons from the side of people who will be eventually needed to use a system, the important question is: Are those liaisons engaged enough and do they have enough power and influence to sell the IT tool (and implications attached to it) to the rest of the people?*

The last prescriptive insight, which is mostly inspired by a quote from Steven Pinker,[3] is:

> *The gap between your mindset and other stakeholder groups' mindsets never closes, but it is not naïve to work toward a narrower gap.*

As the empirical evidence from the OBAP2 project's case study shows us, real-world IT implementation projects are essentially arenas of constantly diverging and converging ideas, understandings, values and expectations held by different groups of stakeholders with respect to social structure and technology, among other things. As a matter of fact, these constant divergences and convergences are part of the nature of organizational life, and they will never lead to a complete and full commonality shared by all stakeholder groups. However, what makes a distinction between successful and unsuccessful IT implementation projects is the extent to which all actors (especially IT implementers) involved in any given IT implementation project are willing to work toward achieving convergence rather than divergence.

6.4.2. Research Prescriptions

The empirical and theoretical findings in this current research suggest that IS and management researchers ought to adopt a new mindset towards the IT implementation phenomenon. Such a new mindset must understand that IT-involved change initiatives are not "inherently" advantageous, nor do those initiatives necessarily chase a fixed, pre-determined "good." As a matter of fact, the definition of "good" most often gets constantly reshaped over the course of any given IT-involved change enterprise. On this

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[3] The original quote by Steven Pinker is: "We will never have a perfect world, but it's not romantic or naïve to work toward a better one."

basis, the present research study suggests that a research area must be opened up and devoted to the notion that "good IT emerges during the implementation." Such a research area can also have interesting ramifications for design science research.

On the other hand, the position of the current research study is that of advocating the primacy of "social theory" over "behavioral theory" (see chapter 1, section 1.2) with respect to both understanding and explaining people's reaction(s) to IT-involved change. The reason of taking this position lies in the fact that IT-involved change occasions by no means can be reduced to or understood by looking only at individual-level phenomena. As many seminal pieces in the extant IT implementation literature (most of which are cited in this present work) show, such enduring, autonomous and irreducible social entities and facts as culture, politics and power distribution cannot be overlooked when one strives to understand and/or explain IT-involved change phenomena. However, this does not necessarily mean that the accounts currently offered in the extant literature would qualify as "social theory." Although there are some types of IT implementation research that supposedly pursue the "methodological holism" doctrine (see Little, 1999), only very few studies (e.g., Ferneley and Sobreperez, 2006; and Mehrizi and Mòdol, 2012) and in only a very peripheral way hint at the notion of "social structure." The fact is this present research study calls for much more than that. There needs to be a new class of IT implementation research in which researchers would produce theories containing the notion of "social structure" as an integral part rather than it only being hinted at.

Another line of research that this current dissertation suggests be opened up relates to the notion of "everyday workplace life experience" (EWLE). Currently, some

IT implementation research studies (in particular, those subscribing to the socio-technical systems perspective) see the mutual constitutive relationship only between the social and the technological. This current research study calls for a change in that classic perspective so that EWLE as an individual-level phenomenon would be considered as having a mutually constitutive relationship with the social properties of the IT implementation context. This conforms to how such fundamental sociological perspectives as "phenomenological sociology" and "sociological imagination" view social occasions. The POITI in general, and new IT in particular, then, would be considered moderators (or interactors) in the aforementioned relationship between EWLE and the social context.

In addition to the ideas outlined above, some specific research questions can also be proposed. In fact, asking the right question(s) is one of the best things that could happen to any research program.

Considering the new research mindset described above and addressing the notions provided in the previous part on practical prescriptions, one might pose the following research questions:

- What unprecedented findings will result from IT implementation research being focused on "apathy vs. engagement" rather than on "resistance vs. acceptance"?

- What are the mechanisms and/or processes for increasing or motivating key stakeholders engagement, especially in those cases in which the stakeholders are completely apathetic to or critical of a certain IT implementation effort?

- What are signs and/or features of bad IT?

- How will focusing on "meaningful use" change the landscape of IT implementation and use research?

- How will theoretical models that focus on the notion of "meaningful use" be different from those that focus only on "use"?

In summary, this present research work advocates deconstructing the concept/label of "resistance." This kind of deconstruction can in turn have significant ramifications for a prospective research agenda in this area. One major ramification could be: what deserves in-depth investigation in regard to the interface between the social, individual and technological is not how people resist or accept supposedly static or pre-determined technological artifacts, which are being implemented and ought to bring about "good" changes, but how dynamics generated by people's reactions to new options and opportunities being enabled by IT are the main source of change in social settings.

6.5. Conclusion

This current dissertation is not just another stereotypical IT implementation case study. This present work, in fact, has contributed in several major ways to both understanding and explaining the IT-involved change phenomenon. On one side, the case study reported in the current research work has led to a change in how we (as IS researchers and practitioners) ought to see people's reactions to IT implementation. This present work promotes the idea that the classic duality of "resistance vs. acceptance" is no longer adequate or valid since IT-involved change occasions cannot be divided into isolated, separate stages such as design and implementation. By introducing the notion of "apathy vs. engagement," this present research study

advocates a perspective in which design and implementation are two highly merged and entangled phases where people's participation and engagement can not only be limited to either one or the other of them; instead participation and engagement are both needed together during the whole IT-involved change enterprise. The explanatory/predictive schemas presented in this current research, however, do not refute all the useful constructs existent in the literature, such as perceived threats, perceived ease of use, inertia or intention to use. The schemas, instead, provide a balanced, unbiased and big-picture theoretical structure within which most of those already existing constructs could find their own appropriate place.

On the other hand, the current work provides major extensions to some previous seminal research studies such as Markus (1983) and Lyytinen and Hirschheim (1987) (see section 5.3.4). With respect to the former research study (i.e., Markus, 1983), this current research, in fact, proposes a much more complete picture (compared to the mere political perspective given by Markus, 1983) of the factors contributing to forming new conditions of the context during a given IT-involved change process. On the other hand, with respect to the latter research study (i.e., Lyytinen and Hirschheim, 1987), the present dissertation extends what Lyytinen and Hirschheim (1987) frame as IS failure by arguing that both failure and success need to be viewed from both human subjects' and observing researchers' perspectives and, consequently, by defining failure and success in terms of both first-level and second-level constructs.

Finally, although this current work has focused on healthcare IT, the ideas presented could also be extrapolated to the research on implementation and/or mal-implementation of other types of IT artifacts, such as ERPs, CRMs, and so forth. This

present study can, in fact, be seen as part of a bigger research program which aims at challenging some fundamental presumptions held by mainstream IS researchers. One of those presumptions is that IT acceptance is necessarily good. Another, deeper presumption is that IT-involved organizational change is necessarily desirable or beneficial.

This current research strives to, at least partially, contribute to the research program mentioned above by looking at a given IT implementation occasion through the eyes of users in order on the whole to deconstruct the concept/label of "resistance." This kind of interpretive approach, though, is not something new in the field of management. For the past twenty years or more, some management researchers have thought and talked about adopting this kind of interpretive perspective to study the phenomenon called "resistance." Here is a very pertinent example from the last sentence of the preface to a highly-cited collection on "resistance" by Jermier et al. (1994):

> They [the studies published in that collection] also make it clear that the interpretations provided by theorists and researchers of resistance are more informed when they take account of the meanings that those who resist give to their own practices.

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VITA

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In general, Kaveh is interested in the application of lessons from the philosophy of science, the philosophy of social science, and the philosophy of design in theorizing the interfaces among the individual, the social, and the technological. His research agenda mostly focuses on taking a sociological/anthropological approach towards the problem

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